

SECTION F

PART TWO - TECHNICAL CAPACITY



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ATTACHMENT F3

Mono Pumps WSAA Code Approved



Mono Pumps (Australia) Pty Ltd Eco 1-60 Pressure Sewer Unit

Product Appraisal – PA 07/02

January 2008

Note 1

This appraisal applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this appraisal.

To maintain the recommendations of this appraisal any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the appraisal report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.

Note 2 Disclaimer

The Disclaimer on page 10 explains a number of very important limits on your ability to rely on the information in this Product Appraisal Report.

Please read it carefully and take it into account when considering the contents of this Product Appraisal Report.

The report was peer reviewed by Russell Jennings, Michael Hordern and Bruce Douglas. Any technical inquiries regarding this report should be directed to the Appraisal Project Manager, Grant Leslie, Phone: 02 9290 3655 - E-mail <u>grant.leslie@wsaa.asn.au</u>

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1. Executive Summary

This Product Appraisal Report (PA07/02) covers the Mono Pumps Eco 1-60 Pressure Sewer Unit The product is designed for collecting and transporting black water to a pressure sewerage system.

The Eco 1-60 is available in a nominal 900lt capacity with 3 models, the standard unit, with telemetry enabled control panel and a standard unit with telemetry and an auto reversing motor. All products have a boundary kit as an optional accessory.

Mono Pumps (Australia) Pty Ltd is quality assured to ISO 9001:2000 by Lloyd's Register Quality Assurance Ltd for both its manufacturing plant and business operations. The tank is supplied by Linpac Rotational Mouldings Pty Ltd which is StandardsMark licenced to AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.

Assessment and review of this information using guidance set by the WSAA infrastructure products and materials network has concluded that the quality assurance requirements have been satisfied for the purpose of this appraisal.

1.1. Recommendation

It is recommended that WSAA Members and Associates accept/authorise the Mono Pumps Eco 1-60 Pressure Sewer Unit product range as listed in the Product Schedule (Table 1) that are relevant to pressure sewerage pipeline design, installation, acceptance testing and commissioning and are in accordance with applicable WSAA Codes and the manufacturer's requirements where specified.

2. The Company

Mono Pumps (Australia) Pty Ltd is part of a world wide network of companies with offices located in New Zealand, China, England, and the USA. The company has specialisation in pumping systems for Mining, Waste Water and Agricultural markets.

3. The Product

The Mono Pumps Eco 1-60 Pressure Sewer Unit comprises of a Collection vessel, Grinder pump, AC Motor, Control Panel and a Boundary Kit as an optional extra in the standard design. The boundary kit has been excluded from this appraisal.

The total well volume is 900lt with 600lt of that capacity designated as emergency storage. 45lt is retained storage, an active storage volume of 120lt (pump on to pump off) and 135lt to alarm level. The tank has a burial depth of 2m allowing 150mm above ground



Mono provides a comprehensive set of Installation, Operation and Maintenance instructions with each unit sold and also provides a householders guide for the unit.

The product is assembled mechanically and hydraulically tested at the companies Mordialloc site in Victoria.

4. Scope of the Appraisal

This Product Appraisal Report covers the Eco1-60 and its derivative products as listed in the product schedule below:

Items	Part Numbers	Size / Capacity	Packaging	Shipping Volume
Eco 1-60	PSS-Eco160	900lt	Individual	1.53 cubic meters
Eco 1-60-RTST	PSS-Eco160- RTST	900lt	Individual	1.53 cubic meters
Eco 1-60-RTRV	PSS-Eco160- RTRV	900lt	Individual	1.53 cubic meters
Boundary Kit	PSS-BK2		Carton	
Control Panel	PSS Control	219x323x190mm	Carton	0.02 cubic meters
Control Panel - RTST	PSS-CONT- RTST	219x323x190mm	Carton	0.02 cubic meters
Control Panel - RTRV	PSS-CONT- RTRV	219x323x190mm	Carton	0.02 cubic meters
Hand Held Controller	PSS DISP UNIT	180x100x25mm	Carton	0.01 cubic meters

Table 1 – Product Schedule

5. Appraisal Criteria

5.1 Quality Assurance Requirements

The WSAA product appraisal network accepts system (ISO 9001) and product certification by a Certification Body at the manufacturing site of strategic products to appropriate Australian or internationally recognised standards. The Certification Body shall have relevant accreditation by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) or by an equivalent international accreditation system recognised by JAS-ANZ.

5.2 Performance Requirements

The Eco1-60 Pressure Sewer Unit has been appraised for manufacturing and performance compliance with AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks and relevant WSAA Codes.

A number of internal test results were supplied, supporting the application.

6 Compliance with Appraisal Criteria

6.1 Compliance with Quality Requirements

Mono Pumps (Australia) Pty Ltd is quality assured to ISO 9001:2000 by Lloyd's Register Quality Assurance Ltd for both its manufacturing plant and business operations.

The tank is supplied by Linpac Rotational Mouldings Pty Ltd which is StandardsMark licenced to AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.

Assessment and review of this information using guidance set by the WSAA Infrastructure Products and Materials Network has concluded that the quality assurance requirements have been satisfied for the purpose of this appraisal.

6.2 Compliance with Appraisal Requirements

Assessment and review of the information provided using guidance set by the WSAA Infrastructure Products and Materials Network has concluded that the appraisal requirements have been satisfied for the purpose of this report.

7 WSAA Agency Network Requests

The WSAA Infrastructure and Materials Network questions were deemed to be 'commercial in confidence' and have not been included in this report, but will be made available upon request to WSAA members.

8 Fitting Instructions, Training and Installation

No specific training is offered by Mono. However Installation, Operation and Maintenance Instructions, and a Home Owners Guide have been provided.

9. Product Marking

The product does not carry any quality system markings

10. Traceability

The supplier of the tank is compliant with AS/NZS 1546.1 – On-Site domestic waste water treatment units – Septic Tanks.

Mono Pumps (Australia) Pty Ltd is fully certified to ISO 9001:2001 by Lloyd's Register Quality Assurance Limited.

These certifications are noted and it is assumed that as long as these certifications remain current then the traceability of batch numbers, test reports, transport, etc, will be acceptable.

11. Packaging and Delivery

The Eco 1-60 products are individually packed or supplied in cartons as described in Table 1.

12. WATER AGENCIES EXPERIENCE/FIELD REPORT

Water agencies have experience with the product range. A number of utilities have individually approved the products for use in their jurisdictions.

13. PRODUCT WARRANTY

No product warranties were supplied with the Application.

14. DISCUSSION

The Eco1-60 range of pressure sewer units comply with the appraisal quality requirements by providing evidence of their Lloyd's Register Quality Assurance Limited quality systems certification for and ISO9001:2001, and WaterMark certification of the tanks to AS/NZ 1546.1. A number of internal test reports were supplied supporting the accreditation.

WSAA Infrastructure and Materials Network questions have been answered satisfactorily.

A number of WSAA members have individually approved the product range for use in their jurisdiction.

15. SUMMARY

Examination of all of the submitted documented material provides an expectation that the Eco1-60 range of pressure sewer units products are 'fit for purpose' in pressure sewerage pipeline networks.

16. LIFE EXPECTANCY RATING

The Eco1-60 range of pressure sewer units has the following life expectances which are based on domestic sewage applications where the system has been installed in accordance with Mono Pumps recommendations;

- a) Collection vessel, 50 years
- b) G60 Grinder Pump, 25 years
- c) Control Panel, 25 years
- d) Boundary Kit, 25 years
- e) Hand Held Controller, 25 years

17. FUTURE WORK

No future works items have been identified. However an agency has suggested that it would be useful for Mono to self assess the product against the WSAA pressure Sewerage Code and report to the Product Appraisal Manager.

18. RECOMMENDATION

It is recommended that WSAA Members and Associates accept/authorise The Eco1-60 range of pressure sewer units product range as listed in the Product Schedule (Table 1) that are relevant to pressure sewerage pipeline design, installation, acceptance testing and commissioning and are in accordance with applicable WSAA Codes and the manufacturer's requirements where specified.

19. Disclaimer

19.1. Issue of Report

This Product Appraisal Report (Report) has been published and/or prepared by the Water Services Association of Australia, Inc and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

By accepting this Report, the Recipient acknowledges and represents to the Publisher[s] and each person involved in the preparation of the Report that the Recipient has understood and accepted the terms of this Disclaimer.

19 Limits on Reliance on Information and Recommendations

19.2.1 Disclaimer of liability

Neither the Publisher[s] nor any person involved in the preparation of the Report accept[s] any liability for any loss or damage suffered by any person however caused (including negligence or the omission by any person to do any thing) relating in any way to the Report or the product appraisal criteria underlying it. This includes (without limitation) any liability for any recommendation or information in the Report or any errors or omissions.

19.2.2 Need for independent assessment

The information and any recommendation contained (expressly or by implication) in this Report are provided in good faith. However, you should treat the information as indicative only. You should not rely on that information or any such recommendation except to the extent that you reach an agreement to the contrary with the Publisher[s].

This Report does not contain all information that a person might require for the purposes of assessing any product discussed or appraised within it (Product). The product appraisal criteria used in preparing this Report may not address all relevant aspects of the Product.

Recipients should seek independent evidence of any matter which is material to their decisions in connection with an assessment of the Product and consult their own advisers for any technical information required. Any decision to use the Product should take into account the reliability of that independent evidence obtained by the Recipient regarding the Product.

Recipients should also independently verify and assess the appropriateness of any recommendation in the Report, especially given that any recommendation will not take into account a Recipient's particular needs or circumstances.

19.2.3 No updating

Neither the Publisher[s] nor any person involved in the preparation of this Report [has][have] any obligation to notify you of any change in the information contained in this Report or of any new information concerning the Publisher[s] or the Product or any other matter.

19.2.4 No warranty

The Publisher[s] do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Report, or the accuracy, completeness or reasonableness of any recommendation in this Report.

APPENDIX A

Q A CERTIFICATES

Contains: <u>Mono Pumps (Australia) Pty Ltd</u> Lloyd's Register Quality Assurance Limited certificate MEL 0924555 for AS/NZS ISO 9001:2000, Quality Management System

<u>Linpac Rotational Mouldings Pty Ltd</u> StandardsMark Licence SMKB20051 for AS/ANZS 1546.1 – On-site domestic wastewater treatment units – Septic tanks.



CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Mono Pumps (Australia) Pty Ltd Mordialloc, Victoria Australia

has been approved by Lloyd's Register Quality Assurance Limited to the following Quality Management System Standards:

AS/NZS ISO 9001: 2000

The Quality Management System is applicable to:

Design, development, manufacture, assembly, repair and service of progressive cavity positive displacement pumps and spare parts. Design and supply of integrated drive arrangements and ancillary plant. Stockholding of pumps, spare parts, selected alternative pump types, disintegration and screening equipment.

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Approval Certificate No: MEL 0924555 Original Approval: 5 October 1993

Current Certificate: 1 March 2006

Certificate Expiry: 28 February 2009

Issued by: Lloyd's Register Quality Assurance Limited

U KAS U KAS MANACEMENT

This document is subject to the provision on the reverse 71 Fenchurch Street, London EC3M 4BS, United Kingdom. Registration number 1879370 This approval is carried out in accordance with the LRQA assessment and critification procedures and monitored by LRQA. The use of the URAS Accordination Mark indicates Accordiation to Proceediation Configuration Configuration 1001

	CERTIFICATE SCHEDULE
Mo	no Pumne (Australia) Ptu I td
WIO	Mordialloc. Victoria
	Australia
Locations	Activities
Mordialloc, Victoria	Design, development, manufacture, assembly, repair and service of progressive cavity positive displacement pumps and spare parts. Design and supply of integrated drive arrangements and ancillary plant. Stockholding, hire and service of pumps, spare parts, selected alternative pump types, disintegration and screening equipment.
Rural Products Mordialloc, Victoria	Sales, stockholding and assembly.
Sydney, New South Wales	Sales, stockholding, hire, assembly, repair and service.
Brisbane, Queensland	Sales, stockholding, hire, assembly, repair and service.
Approval	Original Approval: 5 October 1993
Certificate No: MEL 09	24555 Current Certificate: 1 March 2006
	Certificate Expiry: 28 February 2009
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UKAS	





STANDARDSMARK LICENCE

SAI Global hereby grants to:

Linpac Rotational Mouldings Pty Ltd

81 Frankston Gardens Drive, CARRUM DOWNS 3201, VIC AUSTRALIA

"the Licensee" the right to use the STANDARDSMARK as shown above only in respect of the goods described and detailed in the Schedule which are produced by the Licensee and which comply with the appropriate Standard referred to below as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Manufactured to:

AS/NZS 1546.1 - On-site domestic wastewater treatment units - Septic tanks

The STANDARDSMARK is a registered certification trademark of SAI Global Limited (A.C.N. 050 644 642) and is issued under licence by SAI Global Certification Services Pty Limited (ACN 108 716 669) ("SAI Global"). This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. Refer to the Schedule for the list of product models.

> Licence No.: SMKB20051 Issue Date: 20 October 2004

Alex Ezrakhovich - General Manager Certification For and on behalf of SAI Global



A division of SAI Global Limited ABN 67 050 611 642 Certified Date: 12 May 2003 Expiry Date: 11 May 2008

Authorised Local Signatory, SAI Global



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ATTACHMENT F4

Construction Risk Assessment

1. CONSTRUCTION RISK ASSESSMENT

1.1 Preliminary risk assessment

A preliminary risk assessment for the PTWF will be incorporated into the preliminary design and contract agreement phases of the project. These assessments will be carried out by each organisation based upon their risk assessment protocols and experience with similar types of projects. Water Factory Company will consolidate the individual risk assessment reports and produce an overall assessment schedule. Table (1) summarises how the key findings of the preliminary risk assessment will be presented.

Table (1) – Summary of preliminary risk assessment

		# Issues identified / category			
Key risk area	Total	Pre Construction	Construction	Post Construction	Operations
Risk Area A				C	X
Risk Area B					
Risk Area C					
Risk Area D				S S	
Risk Area D			2		
Total					

1.2 Detailed risk assessment

Risk workshops will be held during detailed design to ensure all risks are identified and appropriate controls implemented. Attendees at risk workshops will include:

- Water Factory Company (WFC).
- Permeate Partners as technical consultant for WFC.
- Key suppliers including GE Water and Mono Pumps.
- Hawkesbury City Council (HSC) to ensure integration with existing HSC infrastructure.
- Johnson Property Group as developer of the new lots in Pitt Town.
- NSW Regulators such as NSW Health and DECCW (as necessary).

Findings from the risk workshops will be compiled and provided to IPART as part of the WICA licensing process.

1.3 Ongoing risk assessment

As part of WFC's commitment to the ongoing protection of human and environmental health, risk documents will be periodically reviewed to ensure they remain relevant and current. Triggers for a risk review include:

- Changes in regulatory requirements.
- Changes in construction requirements.
- Variations to supplier/construct contracts.
- Changes required by the management of the Water Factory Company.
- Changes requested and approved by project stakeholders.
- Changes to the operational structure of the PTWF.
- 12 months has passed since a risk review has been completed.



ATTACHMENT F7

Mono ECO 160 Operations and Mainentance Manual



Installation, Operation and Maintenance Instructions

Eco 1-60

Pressure Sewer Systems



One Company, Unlimited Solutions

Contents

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Warranty

Warranty Statement

- 1. Pressure Sewage Systems manufactured by Mono Pumps are covered by warranty for a period not exceeding twelve months from purchase.
- Mono Pumps will make good by repair, or at Mono's option, the replacement of faulty parts under warranty, providing always that:
 - (a) The equipment was correctly installed and properly used in accordance with Mono Pumps Installation, Operating & Maintenance Instruction and accepted codes of good engineering practice.
 - (b) The claim for goods under warranty arises solely from faulty design, material or workmanship.
 - (c) The repair is carried out in the Mono factory or by an authorised agent or distributor appointed by Mono Pumps.
 - (d) All freight costs to and from the factory or repair agent are to be paid by the purchaser.
- In the case of equipment or components which are not of Mono manufacture, but supplied by them, the warranty is limited to that extended by the suppliers or manufacturers of such equipment.
- 4. Mono Pumps warranty does not cover any of the following:
 - (a) Claims for third party liability of damage caused by failure of any of the company's products.
 - (b) Damage caused by abnormal operating conditions, war, violence, storm cataclysm or any other force.
 - (c) Damage caused by the equipment being used for an application for which it is not recommended.
 - (d) Damage caused by sand or abrasive materials, corrosion due to salt water or electrolytic action.
- 5. The decision of Mono Pumps in relation to any claims or disputes over warranty is final.
- 6. The warranty is in lieu of all other warranties and conditions expressed or implied, written or oral, statutory or otherwise, which are hereby negated and excluded.

7. This express warranty does not exclude any conditions or warranty implied by the Trade Practices Act 1974 or separate State laws and in addition to any other right, that the original purchasers or any subsequent purchaser may have at law.

In case of claim please contact your Authorised Mono Dealer or contact Mono Pumps (Australia) Pty Ltd.



Introduction

Introduction

This manual will provide the user with essential information on the installation, operation and maintenance of the Mono Pressure Sewer System - PSS Eco 1-60.

It is important that the instructions and recommendations presented in this manual are followed during the installation, operation and maintenance of this system.

Throughout the manual there are various safety signs associated with certain tasks. These safety signs are to be used as a guide only and should never be used in place of a job safety risk assessment.

Intended Use

The PSS Eco 1-60 is designed to transport domestic sewage from the point of generation to a sewerage treatment plant, gravity carrier or larger pump station and rising main.

The PSS Eco 1-60 system is designed to handle domestic sewage only. It is not designed to handle commercial or industrial sewage applications. For these types of applications please consult Mono Pumps (Australia) Pty Ltd.

For each property, sewage created in the household flows by gravity into the PSS Eco 1-60 tank. When the level rises to a set point, the pump is automatically started. The self priming pump draws the sewerage into an integral macerator turning the solids into a slurry of small particles. This allows the sewage to be then discharged through small bore pipe (32 NB to 125 NB) into the pressurised reticulation network.

As the sewage is transported under pressure by the positive displacement pump and not by gravity, the PSS Eco 1-60 can be installed in various topography such as :

- Mountainous or hilly land.
- Flat land.
- Clay, rocky soil or areas of shallow top soil.
- Areas of significant environmental sensitivity.
- Built up areas.
- Areas of low population density.

The PSS Eco 1-60 system comprises of:

- 900 or 2200 litre tank with lid.
- Pump with inbulit macerator.
- PSS Eco 1-60 controller.
- All internal tank pipework.
- Level switches.
- Check valve and ball valve on pump's discharge.
- 20m of 240V electrical cable.

Basic Tools Required For Installation

- 121mm hole saw.
- Drill to suit hole saw.
- 13mm spanner.
- 6mm allen key.
- Pipe wrench to suit 85mm diameter barrel union.



Warnings



This pump is not to be operated in environments containing flammable or explosive substances.



All electrical connections must be carried out by a qualified electrician in accordance with local regulatory requirements.



All plumbing connections must be carried out by a qualified plumber in accordance with local regulatory requirements.



Never place hands into the inlet whilst pump is running as there are rotating cutters. Ensure the pump is fully isolated prior to any maintenance.



Duty, maximum pressure and flow must be taken into account when setting up pumping system.



The G60 pump is not designed to be operated partially or fully submerged. Ensure the dry well is kept free of water during installation, operation and maintenance.



The pump weighs 35kg. An assisted lift or multi person lift must be used when moving pump.



High surface temperature for pump motor. Motor may reach temperatures 80 deg C above ambient temperature.



Do not drop, roll or lay the tank on its side, as this will damage the unit.



One Company, Unlimited Solutions

System Specification





1









ITEM	DESCRIPTION	QTY	PART NUMBER
1	Tank	1	CM9025XA (900L) CM9050XA (2200L)
2	Tank Lid	1	CM9045GC
3	Pump For PSS-ECO160	1	CG601R81PA
3	Pump For PSS-ECO160-RTRV	1	CG601R81PA/R
4	Pump Inlet Assembly	1	GRIF 078
5	Alarm Level Sensing Assembly	1	GRIF 202A
6	Run Level Sensing Assembly	1	GRIF 203A
7	Discharge Pump Assembly	1	GRIF 191
8	DWV Grommet Seal	1	AUX 6234
9	Pump Connection Hose Clamps	1	GRIF 218
10	Pump Connection Sleave	1	GRIF 072
11	Electrical Connections (Not Shown) For PSS-ECO160	1	GRIF 080
11	Electrical Connections (Not Shown) For PSS-ECO160-RTRV	1	GRIF 116
12	3" Drain Plug	1	GRIF 053
13	110mm Inspection Port	1	GRIF 104
14	Lid Gasket	1	GRIF 140
15	Pressure Sewer Controller	1	PSS CONTROLLER

G60 Pump Specification

Inlet:	3" Cast Iron Spigot to Suit Nitrile Sleave
Outlet:	1 1/4" BSP Internal Thread
Weight:	35 Kg

Materials

Pump Body:	Cast iron
Stator and O Rings:	Nitrile rubber
Screws, Nuts & Washers:	316 stainless steel
Motor Shaft:	316 stainless steel
Cutters:	Hardened tool steel
Oil (in oil bath):	Shell Tellus Oil 100 anti wear hydraulic and circulating oil. Volume 130 mls
Gasket:	Aramid fibre and nitrile rubber binder

Environmental

Storage Temperature:	-10 to 60 deg C	
Operating Temperature:	-5 to 40 deg C	
IP Rating:	IP55	
Humidity:	100% Max	

Electrical Characteristics

Max. Operating Voltage:	240 V +/- 5%, 50 Hz
Motor Duty:	Short time duty S2-30 minutes.
Max. Starts per hour:	10
Locked Rotor Current:	31.3 Amps
Full load Current:	7.5 Amps
Motor Power:	0.93 kW
Thermal Overload:	Automatic reset

Water Quality

Water Temperature:	10 - 30 deg C.	
pH range:	6 - 10	

G60 Pump Dimensions









Specifications – Page 7 Issued – November 2009 Reference – MPA526/9

Pump Performance

Maximum Suction Lift: 2 metres with 80mm diameter suction pipe.

The chart below indicates the performance characteristics of the pump.



Pressure (Metres Head)



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One Company, Unlimited Solutions

Pressure Sewer Controller Specification

Electrical

Controller Input Voltage:	240 +6/-10 VAC
Max Current (Continuous) :	8 Amps
Max Current (Motor Start) :	20 Amps (Peak)
Circuit Breaker:	15 Amps
Control Circuit Fuse:	0.5 Amps

Outputs

Motor:	1.0 kW Max
	240 VAC
	Overcurrent Protection: 8 Amps
Level Probes:	Normally Open
	Isolated 5 VDC
	2 Volt Trip

Com Connector

- RS232
- 9600 baud
- rts/cts

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C
IP Rating:	IP66

Dimensions & Weight

Dimensions (Carton):	390 x 275 x 290mm
Weight (in Carton):	3 Kg

Default Protection Settings

Pump Motor Current Trip (Over Pressure)	8 Amps
Pump Reset Time From Trip	5 minutes
Number of Current Trips Per Hour Till Alarm	10
Audible Alarm Run Time	5 minutes
Level Sensing Delay Time	2 seconds
Maximum Continuous Pump Run Time	20 minutes
Maximum Pump Starts Per Hour	10
Pump Cool Down Time	10 minutes

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Dimensions of Pressure Sewer Controller









PSS Tank Specification - 900 litre tank

Dimensions of 900 Litre Tank (millimetres)

Part Number: PSS-EC0160

Materials

Tank and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, PE, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Ball Valve	Stainless Steel
	Pipe Work	Stainless Steel

Approvals

Tank tested to AS/NZS 1546.1:1998 Under Licence: 20051 Linpac Rotational Moulding

Weight

Tank 900 Litre only:	120 Kg
Lid only:	8 Kg
Tank 900 Litre fully assembled:	175 Kg

Capacities - 900 Litre Tank

Maximum:	900 Litres
Low Level:	50 Litres
High Level:	150 Litres
Alarm Level:	300 Litres
Emergency Capacity	600 Litres

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Lid Loading

Maximum Loading: 500 Kg

Tank Discharge

1 1/4" BSP Male Thread

Tank Inlet

100mm inlet to be drilled on site using a 121mm holesaw to suit either:

100mm DWV Grommet Seal or

110mm Spigot

Noise Levels

55 dBA (Fast) @ 1 metre Measured during operation of pump. Measurement taken 1 metre directly above tank lid.

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Levels Within 900L Tank







SECTION A-A

Specifications – Page 11 Issued – November 2009 Reference – MPA526/9



One Company, Unlimited Solutions

PSS Tank Specification - 2200 litre tank

Part Number: PSS-ECO160B

Materials

Tank and Lid:	LDPE	
Gasket:	Nitrile	
Pump Inlet:	PVC, PE, Nitrile	
Pump Discharge:	Check Valve:	Stainless Steel Swing Type
	Ball Valve:	PVC True Union
	Pipe work:	PVC

Approvals

Tank tested to AS/NZS 1546.1:1998 Under Licence: 20051 Linpac Rotational Moulding

Weight

Tank 2200 Litre only:	285 Kg
Lid only:	8 Kg
Tank 900 Litre fully assembled:	348 Kg

Capacities - 2200 Litre Tank

· · ·	
Maximum:	2200 Litres
Low Level:	90 Litres
High Level:	440 Litres
Alarm Level:	820 Litres
Emergency Capacity	1380 Litres

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Lid Loading

Maximum Loading: 500 Kg

Tank Discharge

1 1/4" BSP Male Thread

Tank Inlet

100mm inlet to be drilled on site using a 121mm holesaw to suit either:

- 100mm DWV Grommet Seal or
- 110mm Spigot

Noise Levels

55 dBA (Fast) @ 1 metre Measured during operation of pump. Measurement taken 1 metre directly above tank lid.







Levels Within 2200L Tank



Pipe Connection and Lifting Points on 2200L Tank





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Installation



Typical Layout of PSS Eco 1-60 System on Block



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Installation

Installation Checklist



Caution: All plumbing and installation work is to be conducted by a qualified Plumber.

Caution: All electrical connections is to be conducted by a qualified Electrician.

	Action	Checked	
BEF	BEFORE TANK INSTALLATION		
1	No damage has occurred during transit to tank, lid, pump, pipe work/valves or controller.		
2	PSS Eco 1-60 is been installed into an area where there will be no traffic within 1m around lid.		
3	PSS Eco 1-60 is been installed into an area 1.5m clear of all buildings.		
4	PSS Eco 1-60 is been installed with an 1 in 4 gradient away from the lid.		
5	Sewerage plumbing audit on property meets local regulations.		
6	Electrical audit on property meets local regulations.		
7	All installation work (except electrical work) is been conducted by a licensed plumber with drainage experience.		
8	All electrical work is been conducted by a licensed electrician.		
9	Slings, chains or shackles required to lift tank are to statutory regulations.		
10	A 20 amp type D circuit breaker is installed in the meter box.		
11	All trench depths for electrical cable are to local regulations.		
12	Property has been assessed for correct foundations.		
13	Hole for the PSS Eco 1-60 system is to local regulations.		
14	Inlet sewer pipe for PSS Eco 1-60 is no greater than 1285mm depth from ground level.		
DUI	DURING TANK INSTALLATION		
1	Tank is level in hole.		
2	Tank has approx. 250L of water in it, ensuring no floatation occurs during concrete pouring.		
3	Tank does not have the discharge inlet hole drilled in to it, before concrete pouring.		
4	Discharge pipe work has been installed as per pattern on page 12.		
5	All pipes are supported sufficiently for backfill.		
6	Once concrete has been poured, 121mm diameter hole for the inlet pipe has been drilled into tank.		
7	DWV grommet seal has been placed into inlet hole.		
8	Inlet and discharge pipe is connected.		
9	Backfill does not contain large particles (as these can effect tank wall loading).		
AFT	AFTER TANK INSTALLATION		
1	Remove the foam insert and do not reinstall the insert (this is used for protection during transport only)		
2	Pump is primed.		
3	Pressure sewer controller is wired in and powered.		
4	Level sensors have been wired correctly into the pressure sewer controller.		
5	All valves are in the open position.		
6	Pump has been tested through one complete operation cycle and is working as it should.		
7	All barrel unions have been tightened.		
8	Ensure that lid has been fully bolted down evenly.		



Installation

Foundations - PSS Eco 1-60



Caution: All plumbing and installation work is to be conducted by a qualified Plumber.

Caution: As sites vary and there are many potential site hazards, it is recommended that a Job Safety Analysis of each site is done prior to installation or any works.

Caution: Installation holes may require protection and supports to prevent accidents. Refer to site engineer for recommendations.

The illustration below provides a guide to the foundations required for the Eco 1-60 900 litre tank. This is to be used a guide only, as installation is dependent on ground conditions and should be in accordance with the directions of the site engineer.

The Eco 1-60 Tank should be located in an area where there is good drainage of surface water away from the tank. There should be a 1 in 4 gradient away from the lid to help with drainage. It should be as close to the household as possible and in a non trafficable area.


Pipework Connections - Inlet

The connection to the tank from the household is made using 100mm DWV PVC pipe and the grommet seal provided (loose).

Drill a hole (using a 121mm hole saw) at the correct depth using the flats provided. Ensure that hole is central to the flat. Place the DWV grommet seal in the hole with the label facing out. Push the pipe through. Soapy water may assist this process.

Alternatively, a rubber spigot connection can be used. The rubber spigot should have an internal diameter of 110mm.

The maximum depth of inlet from ground level is 1285mm. The minimum is 660mm. Pipework Connections - Outlet

1 1/4" BSP PVC with external thread is supplied for the outlet.

Ensure that discharge pipework leading away from the PSS Eco 1-60 tank, is in a pattern as per page 14 of this manual.

Ensure that discharge pipework leading from the tank is well supported for backfilling.



Image: Constraint of the second s



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Electrical Connections



Warning: All electrical connections is to be conducted by a qualified Electrician.

Prior to installation, an electrical audit must be conducted on the property to ensure the installation will meet local regulations.

Electrical Installation Diagram.

Ensure all electrical connections are made in accordance with local regulations.



Connections at the Meter Box.

The power to the PSS Control box must come from the meter box and be wired in on its own circuit breaker. This should be a 20 Amp Type D circuit breaker.

Electrical Connections - At Tank

Run both the motor cable and the level sensing cable through sealed conduit. At the tank wall connect the conduit to the socket connection that is provided.

Ensure that the conduit is buried in accordance with local regulations.

Electrical Connections - Within Pressure Sewer Controller

Ensure all cables are sealed through the cable glands/ conduit at the base of the controller.

Connect the mains power and the pump leads to the Terminal block mounted on the DIN Rail.

There is no external isolator on the PSS controller. If required an isolation breaker can be added to the DIN rail by an electrican on installation. Typically the controller will be isolated from the household switch board.

* Motor Switch (White) is required for PSS-ECO160-RTRV system only. Do not connect this terminal block if the system is not a PSS-ECO160-RTRV.

Refer to the diagram below.





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Electrical Connections - Motor Plug

The motor connection plug for the PSS-ECO160 system is to be wired as below.



The motor connection plug for PSS-ECO160-RTRV system is to be wired as below.



Assemble the remander of the plug as shown below.



Installation – Page 19 Issued – November 2009 Reference – MPA526/9 **Electrical Connections - Level Sensors**

The level sensors are connected directly into the terminal block on the PCB in the Pressure Sewer Controller. The connection ports are labelled.



The above numbers corresponds to the connections numbers on the plug for the level box inside the tank. The wires in this cable are also referenced with the corresponding connection numbers. The plug is wired as below.



Level Switch Pin Connections

- Pin 1 is the running level connection
- Pin 2 is the alarm level connection.
- Pin 3 is the common connection for both level switches.
- Pin 4 is not used.

Assemble the remainder of the plug as shown below.





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Installation of Pump



Warning: Check that the mains power to the Pressure Sewer Controller is switched off prior to working on the pump.



Caution: Depending of the amount of water in the tank, if the controller is on, the pump may come on automatically.



Warning: The pump weighs 35kg. An assisted lift or multi person lift must be used when moving pump.

- 1. Remove cardboard or foam inserts from the dry well. These are required for support during transport only.
- 2. Remove pump from dry well.
- 3. Fill the suction and discharge ports of the pump with water.
- 4. Place the pump back into the dry well. Ensure that there is a good seal on the 3" suction port by tightening up the hose clamps.
- 5. Hand tighten the union on the discharge (do not use a pipe wrench).
- 6. Ensure that the check valve inspection cap is facing up.
- 7. Ensure that the suction valve and the discharge valve are fully open.
- 8. Connect the IP68 plug for the pump.
- 9. Fill the tank with approx. 250 litres of water, through the inspection port.
- 10. Turn on power to the controller.
- 11. Hold the toggle switch on the float switch box inside the tank for 20 seconds. Priming should occur in less than 20 seconds. Once prime is achieved, stop running the pump.
- 12. Check that there are no leaks in the system.

Installation of Level Sensors



Caution: Ensure that you keep a watch on the water level in the tank as you perform this operation, so that the pump is not dry run.

- 1. Switch on power to the Pressure Sewer Controller. Pump should be activated.
- 2. Allow pump to pump out water to below the low level sensors. Once the water has fallen to below the low level sensor the pump will turn off.
- 3. If pump does not turn off, check Level Sensor wiring.
- 4. Refill the tank through the inspection port.
- 5. When the water level is high enough to cover the low level sensor the pump will turn on.
- 6. If pump does not turn on, check level sensor wiring.
- 7. Keep filling the tank up.
- 8. Once the tank reaches the high level sensor, the alarm will sound.
- 9. If the alarm does not sound, stop filling tank, turn off pump and check high level sensor wiring.
- 10. If level sensors are working as they should, turn off the water and pump the water out until the alarm turns off.
- 11. Turn off pump.

Firmly secure the lid. To secure the lid, place the lid on top of the tank and align the T shaped fasteners in the slots. Compress the lid at the fastener you are tightening by standing on the lids edge. The fasteners only require a 1/4 turn in either direction to tighten. The closed position is indicated by the line on the hex head pointing out from the tank, as shown below.

The system will now work automatically as it fills with water.





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Operation

Operation of Pressure Sewer Controller

System Indicators

The Pressure Sewer Controller features various indicators which signify how the system is functioning. The functions of the indicators are as follows:

Power On

This indicates that mains power is connected to the unit.

Pump Running Indicator

This indicates when the pump is running.

Alarm Indicator/ Strobe/ Siren

This indicates operational problems with the PSS Eco 1-60 system. When the alarm begins, limit the use of water (there is 600L emergency storage in tank). If the strobe light does not stop flashing after ten minutes, contact your service provider.

The table at the bottom of the page indicates the functions that the alarms will operate.

Mute Button

By pressing this button, the end user can switch off the audible alarm. This will not switch off the visual alarm. This button is located on the underside of the unit.

Operation of Protection Features

Function	Description	Reset	Pump Shutdown	Warning Light	Siren	Strobe
Over Current	Trips when current exceeds programmed maximum current level.	Via Trip Reset Timer	YES	YES	NO	NO
Max Current Trips	Trips when number of current trips exceed programmed value.	Automatic - if fault clears	NO	YES	YES	YES
Exceed max. run time	Trips when pump/motor has continuously run greater than the programmed maximum time	Via Motor Cool-Down Time	YES	YES	YES	YES
Exceed max. Starts/ Hour	Trips when maximum starts per hour has been exceeded	Via Motor Cool-Down Time	YES	YES	NO	NO
High Level	Trip when high level probe is active	Via Low Level Probe	NO	YES	YES	YES





Desludging The PSS Eco 1-60 Tank

Over time, sewage sludge can build up in the bottom of the tank. The PSS Eco 1-60 tank has been designed so that desludging can occur without having to remove the lid of the tank.

Access to the wet well can be gained by the 110mm inspection port on top of the tank

This port enables a 100mm diameter suction pipe into the tank.



If additional access is required, there are an extra two access points in the dry well. The first access point is the 100mm port under the pump inlet assembly. The pump would need to be removed to access this port. The second access point is the 80mm drainage point for the dry well. Removal of Sludge via Inspection Port



- 1. Isolate PSS system. Ensure that pump can not be turned on.
- 2. Unscrew the lid of the inspection port.
- 3. Place suction pipe down the hole and into the tank until it hits the bottom of the tank (approx. 2.2m).
- 4. Remove sludge from the bottom of tank.
- 5. Once completed, remove suction pipe from inspection port.
- 6. Fill tank with approximately 250 litres via the inspection port.
- 7. Re-prime pump as per Installation of Pump (pg 20).
- 8. Replace lid of inspection port.

Removal of Sludge via the Additional Access Points.



Caution: The pump weighs 35kg. An assisted lift or multi person lift must be used when moving pump.

The first access point is the 100mm port under the pump inlet assembly. The pump will need to be removed to access this port.

The second access point is the 80mm drainage point for the dry well.

- 1. Isolate PSS system at the boundary kit. Isolate the Pressure Sewer Controller and ensure that pump can not be turned on.
- 2. Unscrew bolts in lid and place underside up and away from dirt etc.
- 3. The pump will need to be removed to reach the first access point.
- 4. Unscrew the hose clamps around the rubber sleeve and remove the four bolts from the suction pipe flange. Remove pump and inlet assembly.
- 5. Unscrew the 80mm plug if access via the dry well drainage port is required.
- 6. Place a suction pipe down either or both access points and into the tank until the hose hits the bottom of the tank (approx. 2.0m).
- 7. Remove sludge from the bottom of tank.
- 8. Once completed, remove suction pipe.
- 9. For the first access point, replace pump and inlet assembly.
- 10. Tighten up the four bolts in the suction pipe flange and the hose clamps around the rubber sleeve.
- 11. Fill tank with approx. 250 litres of water via the inspection port.
- 12. Re-prime pump as per Installation of Pump (pg 20).
- 13. If second access point has been used, replace the plug.

- 14. Clean up the dry well ensuring that it contains no liquids.
- 15. Check that the 50mm lip around the top of the tank and that the lip on the underside of the lid is clean. This will ensure a good seal has occurred so that the dry well remains sealed.
- 16. Place the lid and bolts back onto the PSS tank. The lid is keyed, so that it can be only fitted one way.
- 17. Screw the bolts down in place, ensuring that a good seal of the dry well has occurred.
- 18. Turn Pressure Sewer Controller back on.
- 19. Turn PSS system at boundary kit back on.

Cleaning the Level Sensors

It is recommended when desludging the PSS Eco 1-60 tank, that the level sensors are cleaned.

- 1. Unscrew the level sensors from the barrel union. When replacing the level sensor in the barrel union add thread tape. There is no need to open the pressure sensor.
- 2. Lift up and out the level sensors and assembly.
- 3. Clean off any build up around the end of the tube.
- 4. Replace the level sensors back into the tank.



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Maintenance Checklist



Caution: Isolate mains power before commencing any work on the PSS Eco 1-60 system.



Caution: High surface temperature for pump motor. Motor may be reach temperatures 80 deg C above ambient temperature.

	Action	Checked
1.	Ensure that household has discontinued use of water.	
2.	Pressure Sewer Controller is off.	
3.	Isolate the mains power (follow standard electrical lockout procedures).	
4.	Ensure that discharge valve in boundary kit is turned off.	
5.	Remove lid and ensure that underside of lid is not in dirt.	
6.	Disconnect pump plug from internal power supply.	
7.	Disconnect level sensor power plug from internal power supply	
8.	Ensure that sliding gate valve on suction is closed.	
9.	Ensure that discharge valve in tank has been closed.	
10.	Attach lifting device to pump.	
11.	Unscrew clamp on rubber sleeve closet to suction side of pump.	
12.	Remove pump by lifting straight up.	
13	Clean up any liquid in the dry well.	
14	Ensure that lid has been replaced on tank and tightened to prevent water from entering into the dry well.	

Cleaning the Level Sensors

- 1. Unscrew the level sensors from the barrel union. When replacing the level sensor in the barrel union add thread tape. There is no need to open the pressure sensor.
- 2. Lift up and out the level sensors and assembly.
- 3. Clean off any build up around the end of the tube.
- 4. Replace the tubes back into the tank.



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Pump Disassembly





Caution: Ensure that motor has been disconnected from any power supply before commencing any work.



Caution: Pump may contain sharps ie: needles. Ensure that suitable protective gloves for sharps are worn while working on pump.

Caution: Pump may contain human effluent. Ensure that suitable protection is worn during maintenance.





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Caution: Mechanical seal is contained in an oil filled bath. Before suction chamber can be removed, the oil needs to be drained.







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Pump Spare Parts List



 _		_		_	_		_	_		_		
PART NUMBER	K113260F	W113251F	LE GRIF 024	TC GRIF 025	GRIF 029	SF GRIF800 2530	RR GRIF 2200	CD GRIF 075M	F115300F	W115050F	W115251F	P130210S
QTY	4	4	-	-	٦	-	-	٦	4	4	4	-
DESCRIPTION	M8 S/S Bolt	Spring Washer	Cutter Impeller	Cutter Ring	O Ring	Rotor HCP	Stator	Discharge Chamber	M12 Bolt	Washer M12 S/S	Spring Washer M12	Plug 1/4"
ITEM	13	14	15	16	17	18	19	20	21	22	23	24

PART NUMBER	GRIF-09301MTR	K150614P	OO CP800 1060	GRIF 021	P130210S	CD GRIF 071M	GRIF 073	W115050F	N115100F	W115251F	GRIF 039	W113051F	
ατγ	۲	1	1	۲	2	۲	۲	4	4	4	2	4	
DESCRIPTION	Motor 240V 1 Phase	SQ KEY 6x5x14	Mechanical Seal	Gasket	Plug 1/4"	Suction Chamber	Foot	Washer M12 S/S	Nut M12 S/S	Spring Washer M12	Lifting Lug	Washer M8 S/S	
ITEM	-	2	3	4	5	9	7	8	6	10	11	12	



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Fault Finding

Fault Finding



Warning: Failure to respond to a flashing strobe/audible alarm, will result in damage to the PSS Eco 1-60 system.

It is recommended that a PSS handheld display unit is used to help the operator determine and repair settings for the PSS Eco 1-60 system.

SYMPTOM	CAUSE OF TROUBLE	CHECKING PROCEDURE	CORRECTIVE ACTION	
Flashing strobe/audible alarm	udible High level probe has been activated. Check the sewage level in the tank to ensure that the tank is not full. Check that the pump is able to handle the flow coming into the tank. If water level is not past the high level probe, check that the level sensors are working as per page 20 of this manual.		If tank is full, stop all water use. If tank is above high level sensor but is not full, minimise water usage as there is 600L emergency storage in tank. Rewire the level sensors as per page 19 of this manual.	
		Check that the pump is working and that there is sewage been discharged from pump.	Pull out the pump and replace or repair.	
	Pump has exceeded maximum current trips. This is most likely due to over pressure in the discharge line.	Check to ensure that there is no closed valves on the pump's discharge line. Check to ensure that there is no closed valves in the network.	Open all closed valves.	
		Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.	
		Check that the cutters in the pump are not jammed or blocked.	Pull out the pump and remove blockage.	
		Check that the stator has not been run dry.	Pull out the pump and replace or repair.	
		Check the setting in the controller for maximum number of current trip levels.	Return maximum number of current trip levels back to default factory settings.	
	Pump has been running for too long.	Check that there is not too much water flowing into the tank.	If a large spa water is been dumped into the sewer system, then this can cause the pump to run too long. Install a flow restrictor at the spa.	
		Check that the pump is turning and producing flow.	Pull out the pump and replace or repair.	
	Failing to respond to the flashing strobe or audible alarm.	Check the complete system (all pipework, level sensors, pump etc) for any damage.	Replace or repair system.	
Increased pump running time/pump runs at	Partial blockage of inlet.	Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.	
reduced capacity.	Stator has been damaged.	Check the condition of the stator.	Pull out the pump and replace or repair.	
Pump run light is flashing.	Motor not connected, motor faulty OR faulty wiring.	Check to ensure motor is wired to controller correctly as per installation instructions and check for lose wiring in the controller.	If motor is wired to controller correctly and no lose wires re found and the PUMP RUN light continues to "flash" replace the motor.	



Fault Finding

SYMPTOM	CAUSE OF TROUBLE	CHECKING PROCEDURE	CORRECTIVE ACTION	
Warning light on controller is "ON".	Current exceeds maximum number of current trips setting.	Check to ensure that there is no closed valves on the pump's discharge line. Check to ensure that there is no closed valves in the network.	Open all closed valves.	
		Check discharge line or network for blockages.	Clear any blockages in the discharge line or network.	
		Check that the cutters in the pump are not jammed or blocked.	Pull out the pump and remove blockage.	
		Check that the stator has not been run dry.	Pull out the pump and replace or repair.	
		Check the setting in the controller for maximum number of current trip levels.	Return maximum number of current trip levels back to default factory settings.	
		Check that there is not too much water flowing into the tank.	If a large spa water is been dumped into the sewer system, then this can cause the pump to run too long. Install a flow restrictor at the spa.	
		Check that the pump is turning and producing flow.	Pull out the pump and replace or repair.	
	Maximum number of starts per hour has been exceeded.	Check the setting in the controller for maximum number of starts per hour.	Return maximum number of starts per hour back to default factory settings.	
Tank is full but pump does not turn on.	Level sensors are wired incorrectly.	Check the electrical connections of the level sensors as per page 19 of this manual.	Rewire the level sensors as per page 19 of this manual.	
		Check that the level sensors are working as per page 20 of this manual.	Rewire the level sensors as per page 19 of this manual.	
	Blocked level sensors.	Check sludge level in bottom of tank. Check the level sensor tube, nipple and line for any blockages.	Desluge the tank as per page 22 of this manual. Clear level sensors of blockage.	
	Air leaks in level sensor assembly.	Check the level sensor assembly for air leaks.	Replace level sensor assembly.	
	Controller is not turned on.	Check that there is power to the controller.	Contact supply authority for correction.	
	No power or incorrect voltage.	Voltage must be +/- 10% rated voltage.	Contact supply authority for correction and voltage symmetry.	
	Defective wiring.	Check for loose or corroded connections.	Correct faulty wiring or connections.	
Controller states that pump is running, but	Circuit breaker is in the "off" position.	Open controller and check circuit breaker.	Turn circuit breaker to the "on" position.	
there is no discharge	Wiring of the motor plug or wiring of the motor is incorrect.	Check wiring of the motor plug as per page 19 of the manual. If this	Correct faulty wiring or connections. If fault appears to be with the motor, contact your supply authority.	
	Pump has dry run.	Pull the pump out and check the stator.	Replace the stator and clean up the rotor.	
	Pump motor is turning but there is no discharge.	Pull the pump out and check the internal parts of the pump.	Pull out the pump and replace or repair.	
	Air leaks are present in the suction pipework.	Check for water noise running back down the suction pipework when the pump is stopped.	Tighten hose clamps ensuring that there are no air leaks at this point.	
	Sliding gate valve is closed.	Check the position of the handle of the gate valve. Check the stator for possibility of dry run.	Pull out the pump and replace or repair. Ensure that gate valve is in the open position.	



Optional Accessories

PSS Handheld Display Unit

Part No.:

PSS DISP UNIT



The PSS handheld display unit is an optional accessory that allows the operator to extract data and change software settings within the Pressure Sewer Controller.

The PSS handheld display unit is powered either from the Pressure Sewer Controller or a 9 volt battery. If the Pressure Sewer Controller is running the display unit takes power from the controller. If the Pressure Sewer Controller is not connected to power, the PSS handheld display unit will run off the internal battery, provided that the battery is not flat. Provided that there is battery power, the PSS handheld display unit will also power up the microprocessor on the Pressure Sewer Controller so that settings can be changed without the controller being connected to mains power.

The PSS handheld display unit has two sets of functions, primary and secondary. The primary functions will give actual information on the PSS Eco 1-60 system. The secondary functions allows the operator to change certain functions of the Pressure Sewer Controller software.

Primary Functions

To access the primary functions, press the number key then enter.

Number Key	Primary Function
1	Number of Starts
2	Hours Run (Pump)
3	Number of Power Resets
4	Number of Current Trips
5	Motor Amps
6	Number of Starts per Hour
7	Number of High Levels
8	Serial Number and Date of Manufacture of the Pressure Sewer Controller
9	Unit ID of the Pump Display Unit

Secondary Functions



Caution: Secondary functions should only be changed by an experienced operator, as changing the settings from the factory defaults could cause damage to the PSS Eco 1-60 system.

To access the secondary functions, press:

- * key
- Number key for the function to be changed.
- Enter
- New Value (that this function is to be changed too)
- Enter

Number Key	Secondary Function
1	Motor Trip Amps
2	Motor Trip Reset Time (minutes)
3	Motor Trip Maximum (No. of current trips allowed before alarm)
4	Audible Alarm Time (minutes)
5	Level Delay Time (seconds)
6	Maximum Run Time
7	Maximum Starts/Hour
8	Motor Cool Down Time
9	Set Defaults (1 = Return back to factory settings)



Optional Accessories

Boundary Kit



The boundary kit is an optional accessory, that allows an operator to isolate an individual property from the common sewerage network. The boundary kit contains a boundary kit box with a stainless steel lockable ball valve and check valve.

The boundary kit is installed between the main pressure network and the PSS Eco 1-60 system. When work is required on the PSS Eco 1-60 system and/or property, the lockable ball valve in the boundary kit can be turned into the off position preventing sewage from the common network flowing back into the PSS Eco 1-60 tank.

Materials

Boundary Kit Box:	Black LDPE		
Lockable Ball Valve:	316 stainless steel		
Hex Nipple:	316 stainless steel		
Check Valve:	316 stainless steel		

Environmental

Storage Temperature:	-10 to 60 deg C
Operating Temperature:	-10 to 50 deg C

Boundary Kit Dimensions





PSS-BK5







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Optional Accessories



Mono Pumps has an extensive range of telemetry options that can be added to the standard PSS Eco 1-60 system. These telemetry options can be individually tailored to your requirements.

For all inquiries with regards to this option, please contact Mono Pumps.



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ATTACHMENT F9

Water Quality Management Policy



Water Quality Management Policy

Water Factory Company and its Water Utilities support and promote responsible sewage management and the use of recycled water.

Our management approach will ensure that we consistently achieve the standards set in the guidelines for Sewage and Recycled Water as part of the *National Water Quality Management Strategy.*

To achieve this we will:

- protect public and environmental health first and foremost.
- create partnerships with state government health and environment agencies appropriate to each utility location.
- engage with our communities in a way that adds value to them.
- be recognised as a technology leader.
- manage sewage collection and recycled water quality at all points along the delivery chain from source to the recycled water user.
- use a risk-based approach in which potential threats to water quality are identified and controlled before they occur.
- establish regular monitoring of control measures and be recognised as a strong communicator with all stakeholders.
- develop appropriate contingency planning and incident-response capability.
- continually improve our practices by assessing performance against corporate commitments and stakeholder expectations.



Water Factory Company and its Water Utilities will implement and maintain recycled water management systems consistent with the *National Water Quality Management Strategy* to effectively manage the risks to public and environmental health.

All managers and employees involved in the sewage and recycled water services are responsible for understanding, implementing, maintaining and continuously improving our management systems.

Signed by

Mr Anthony Brinker - Chairman

Mr Terry Leckie - Managing Director

Mr Steven McKewen - Chief Operating Officer



ATTACHMENT F13

Application for Land Subdivision Water Factory Lot

Bona Vista Properties Pty Ltd

ABN: 60 095 392 126 PO Box A 1308, Sydney South NSW 1235

Statement of Environmental Effects

Subdivision for the Purpose of a Water Recycling Facility

Lot 1062, DP 1131838 – Bootles Lane, Pitt Town

Prepared by Bona Vista Properties Pty Ltd

Date: February 2010

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1 Introduction

1.1 Reason for Development Application

Bona Vista Properties Pty Ltd, owner of the land to which this Statement of Environmental Effects (SoEE) applies, has prepared this submission for a proposed land subdivision of Lot 1062, DP 1131838 within the Bona Vista Precinct as part of the Vermont Pitt Town Release Area.

This SoEE accompanies a Development Application to Hawkesbury City Council (Council) seeking Council consent to subdivide the land for the purpose of a Water Recycling Facility. Please note that this application only seeks consent for the subdivision of the land for the intended purpose. The intended purpose (being the Water Recycling Facility) will be documented within a secondary (and separate) Development Application which will be submitted at a later date.

A SEPP 1 submission accompanies this Development Application as the subdivision of the land, for the purpose of a Water Recycling Facility, does not comply with the minimum lot size criteria as outlined in the Hawkesbury Local Environmental Plan 1989. No dwelling entitlement will apply to the proposed Water Recycling Facility site as this subdivision proposal is not for residential use. As outlined in this SEPP1 submission, in this specific case it is deemed that the lot size development standard is unnecessary and unreasonable.

This subdivision is required for Bona Vista Properties P/L to give title to a licensed company under the Water Industry Competition Act 2006, to enable them to construct and manage a Water Recycling Facility to service the Vermont Pitt Town Release Area, as resolved by Council on 25 August 2009. The Vermont Pitt Town Release Area is a residential release area that has been Part 3A Concept Plan approved by the Minister for Planning and will be progressively developed over the next 10 - 15 years. Provision of sewerage infrastructure is a mandatory requirement to ensure continues development of Vermont Pitt Town.

1.2 Purpose of this Statement

The purpose of this report is to provide Council with all the relevant information necessary to assess this subdivision proposal in order to determine the DA in accordance with the *Environmental Planning and Assessment Act (EP&A Act), 1979.*

1.3 Consultation

On 25 August 2009 Council resolved in-principle support for the provision of an alternative sewer scheme to service Vermont Pitt Town. In order to service the Vermont Pitt Town Release Area in the manner proposed (ie via a Water Recycling Facility as defined in *State Environmental Planning Policy (Infrastructure) 2007* by a third party licensed under the Water Industry Competition Act 2006 legislation) a subdivision of the land is a necessary step to achieve this outcome.

On 3 February 2010 the proponent conducted a Pre-DA meeting with Council's Director City Planning, Planning Manager, Senior Town Planner and Senior Engineer to discuss this subdivision proposal. Council Officers raised the following matters which are to be documented within this SoEE:

- (1) Plan illustrating the location of the adjacent proposed bio-retention swale and location of the 1:100 year flood line with respect to the proposed Water Recycling Facility allotment (*addressed in Section 4.2.1 & 4.2.3*)
- (2) Include a section on the history of the planning process (*addressed in Section* 2.1)

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- (3) Address the Pitt Town DCP Objectives (addressed in Section 7.1.4)
- (4) Ensure that the application confirms that no dwelling entitlement will be permitted on the Water Recycling Facility allotment (*addressed in Section 1.1 & 5.0*)
- (5) Provision of a statement from an Ecologist regarding EEC vegetation on the Water Recycling Facility allotment (*addressed in Section 4.2.4 & 7.2.4*)
- (6) Address Council's Draft Comprehensive Local Environmental Plan (*addressed in* Section 7.1.3)
- (7) Provide commentary on the Heritage Item, cross hatched on the LEP map (*addressed in Section 7.1.2 & 7.3.2*)
- (8) Provide details of any Section 90 approvals under the National Parks and Wildlife Act (*addressed in Section 6.3.1*)

1.4 Summary of Conclusions and Recommendations

This report concludes that whilst the subdivision of the land does not meet the minimum lot size criteria (10ha) within its Environmental Protection – Agriculture Protection zone, the subdivision of the land for the sole purpose of a Water Recycling Facility (by a company to be licensed under the Water Industry Competition Act 2006) does not detract from the intent of the objectives of this zone, does not provide a dwelling entitlement, and is for a public purpose and therefore subdivision consent could be granted.

This subdivision enables the Water Recycling Facility to be established consistent with the resolution of Council dated 25 August 2009 regarding the establishment of a separate authority to service the sewer needs of the Vermont Pitt Town Release Area. Water Industry Competition Act 2006 legislation enables this to occur.

Accordingly, it is recommended that the Council approve the subject DA, with conditions, pursuant to clause 80(1) of the EP&A Act, with SEPP 1 concurrence being granted by Department of Planning.

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2 Background

2.1 Planning of Vermont Pitt Town

On 12 October 2007, the Minister for Planning declared the Pitt Town Residential Precinct to be a Major Project and in December 2007, Johnson Property Group (JPG) lodged a Part 3A Concept Plan Application for the project. The Concept Plan Application was accompanied by a detailed Environmental Assessment dated December 2007 prepared by planning consultants Don Fox Planning.

On 10 July 2008, the Minister for Planning issued Determination 07_0140 granting Part 3A Concept Plan Approval for the Pitt Town Residential Precinct. In total, the approval created potential for 943 residential lots within the Vermont Pitt Town release area.

The Minister for Planning also approved rezoning of the Pitt Town Residential Precinct on 18 July 2008 to permit development as proposed in the Concept Plan.

Whilst neither the rezoning nor the Part 3A Concept Plan applied to the land which is the subject of this subdivision proposal, we note that Condition B6 of the Part 3A Concept Plan requires, *"written evidence of arrangements being made with Sydney Water, or other approved supplier, for the provision of individual water supply and sewerage services to all lots within each stage, will be submitted to the Principal Certifying Authority prior to certification of the Subdivision Plan in respect of that stage".* Therefore, with respect to sewerage services, there is an obligation to ensure that infrastructure is in place to service the Vermont Pitt Town estate and this application forms part of ensuring this obligation is satisfied.

In relation to subdivision development applications, Council have already granted subdivision consent to the staged development of the Bona Vista precinct (246 residential lots) and the staged development of the Cleary Precinct (112 residential lots). The conditions of both subdivision consents outline the requirements for connecting proposed lots to sewer infrastructure. Again, this subdivision proposal is a necessary step in ensuring this obligation is satisfied.

2.2 The Sewerage System

Sewage disposal services for the existing village of Pitt Town is provided via a combination of a reticulated sewerage system for the majority of the village and on site disposal for the remaining lots.

The reticulated sewerage system is owned and operated by Council and consists of gravity mains carrying effluent from individual lots within the current village to a pump station (PS J) located in Wellesley Street, Pitt Town. The effluent is then pumped from PS J to the McGraths Hill Wastewater Treatment Plant via a rising main located generally along Pitt Town Road. Council have advised that the pumping station, rising main and McGraths Hill treatment works are all almost at capacity.

To provide reticulated sewerage services to the Vermont Pitt Town release area, Council (in consultation with Johnson Property Group) adopted a sewerage strategy in October 2008. This included the installation of a new pump station (Pump Station T) off Bootles Lane / Johnston Street and associated rising main.

The cost to provide the entire sewer infrastructure to satisfy Council (being the sewer service authority) was estimated at \$21.35 million. This cost is inequitable and prohibitive for the development of the Vermont Pitt Town release area and an alternative solution was sought by Johnson Property Group.

Recent legislative changes to the Water Industry Competition Act 2006 (WICA) were made in August 2008. In brief this legislation enables private entities to become a Water Authority with all the powers of any current Water/Sewer Authority. The legislation falls under the responsibility of the Minister for Water and is regulated through the Independent Pricing and Regulatory Tribunal (IPART). IPART has strict guidelines as to who can be granted a licence under the WICA legislation. However, once a licence is granted, residents who choose to connect to the private sewerage scheme will fall outside of Council's authority for sewer services.

In consultation with Council officers, Johnson Property Group developed a proposal to construct an independent Water Recycling Facility for Vermont Pitt Town under the guidelines of the WICA legislation. The Water Recycling Facility proposal treats sewage locally and produces high quality recycled water for non-potable uses within the community. This local treatment and non-potable reticulation reduces infrastructure costs and improves the viability of Vermont Pitt Town.

Whilst Council plays no part in the determination of granting a WICA licence, Council has resolved in-principle support of this alternative scheme by way of resolution on 25 August 2009.

An explanatory fact sheet regarding the WICA legislation is attached in Appendix B.

2.3 The Subdivision

Deferred development consent was granted by Hawkesbury City Council on 24 April 2007 (DA0557/06) for staged development of the Bona Vista precinct, including 224 residential lots with landscaping, new and upgraded roads. Development consent became operational on 26 July 2007. Recently, Council resolved to modify this consent to permit 246 residential lots, consistent with the Part 3A Approval for Pitt Town.

On 29 January 2009, the NSW Land Title Office registered Stage 1a of the Bona Vista Precinct, being the creation of super-lots to reflect each stage of this precinct, including the creation of a residue lot, known as Lot 106 DP 1123395. Lot 106 was 8.343ha in area and zoned Environmental Protection – Agriculture Protection (note: Lot 106 was approved and registered as an undersized lot in the Environmental Protection – Agriculture Protection zone).

Pursuant to the October 2008 Council adopted sewer strategy (mentioned in Section 2.2 of this submission), new Pump Station T has recently been erected on Lot 106. Pump Station T had to be transferred to become a Council asset and as such, required its own land title for transfer.

Council authorised the further subdivision of Lot 106, with the NSW Land Title Office recently registering DP 1131838 – creating Lot 1061 (approximately 861sqm – the Pump Station T lot) and a residue lot (Lot 1062) being the balance of the original 8.343ha.

This application proposes the further subdivision of the Lot 1062 residue parcel to create a lot for the purpose of a Water Recycling Facility (as defined in *State Environmental Planning Policy (Infrastructure) 2007*). Whilst Council approval is not required for the installation of the Water Recycling Facility, Council's approval is required to the subdivision of the land so that a Land Title can be transferred to a licensed authority under WICA 2006 legislation to install the Water Recycling Facility public utility.

We note that the proposed area (as shown on the attached draft plan of subdivision – *Appendix A*) does not meet the minimum lot size requirements outlined in the Hawkesbury LEP for the Environmental Protection – Agriculture Protection zone. As outlined, the original parent lot (Lot 106, DP 1123395) was already an approved undersized parcel. The adjacent SPS T parcel has been subdivided from the parent lot on an 840sqm piece of land and although it did not meet the minimum lot size requirements it was created to support the undertaking of a public purpose (Council sewer assets). It is suggested that in order to service the Vermont Pitt Town Release Area in the manner proposed (ie via the WICA legislation) a subdivision and SEPP 1 approval is a necessary step to achieving that outcome.

3 Site Context

3.1 Location

The site is located to the north of Pitt Town, approximately 6 kilometres from Windsor. A general location of the site is depicted on **Figure 1**.



Figure 1: The site location

3.2 Site Description

The site of the proposed Water Recycling Facility is located within the Bona Vista Precinct at the intersection of Johnston Street and Bootles Lane, Pitt Town.

The site is generally rectangular in shape, with an approximate 52m frontage to Bootles Lane and 39m frontage to Johnston Street. The 3,125sqm site adjoins the southern and western sides of Lot 1061 DP 1131838, being the new Council Sewer Pump Station T site, as shown in **Figure 2**. A larger proposed plan of subdivision is attached in *Appendix A*.

The site is sparsely vegetated, with very little understorey vegetation.

There are no other improvements on the subject land.

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Figure 2: Draft Deposited Plan of Subdivision

3.3 Site Analysis

A Site analysis diagram, identifying the key natural and built environment features, opportunities and constraints of the site and the surrounding area was prepared for the Pitt Town Residential Precinct for the Part 3A Concept Plan Application. This drawing is reproduced below at **Figure 3**.



Figure 3: Site Analysis Diagram (prepared for the Part3A Concept Plan Application)

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4 Environmental Impact Assessment

4.1 Topography, Geology and Soils

4.1.1 Existing Environment

Pitt Town is in a semi-rural area characterised by farming land. The study area lies to the north of the town centre. The surrounding landscape slopes away from the site towards the east and south. The topography of the site for the proposed Water Recycling Facility is relatively flat, with the site grade falling gently in a north-west to south-east direction. This area is comprised of native bushland, although little vegetative understorey exists.

The 1:50,000 geology sheet for Windsor indicates that the site locality is underlain by Tertiary deposits with a variety of materials including sand and loam, clay, claystone and sandstone, conglomerate, laterite and lateritised gravel.

A geotechnical investigation has been carried out by Golder Associates and a report issued; *Geotechnical Investigation Proposed Residential Development Pitt Town, NSW* dated June 2005 (see **Appendix C**). The report discusses the geotechnical investigation and based on the information available, it can be deduced that:

- o Ground condition is relatively consistent across the study site;
- Soils generally comprise of sand and clay mixtures;
- o Bedrock was not encountered with the depth of investigation;
- In the eastern half of the site the profile is predominately clay with a variable layer of silt and sand;
- o Seepage was encountered to a depth of 0.7m to 2m in several of the test pits;
- The site of the proposed works would not be located in an area subject to landslip.

Contamination investigations indicated there would be a low risk of buried materials (such as underground tanks or potential fill).

There are no known acid sulphate soils on the site.

4.2 Hydrology and Water Quality

This section covers flooding, surface water quality and groundwater.

4.2.1 Surface Water

The project is within the Upper Hawkesbury River sub-catchment of Hawkesbury-Nepean River. Water quality in the river has been severely impacted by urban development. The Pitt Town LES summarised existing water quality data from the Hawkesbury River, upstream and downstream of Pitt Town. The data showed that compliance for major recreational areas such as swimming and boating was very poor in some parts of this section of river due to high levels of faecal coliforms and/or chlorophyll-a, whereas compliance to secondary contact recreation value was 'fair'. Compliance with aquatic ecosystem value across the sub-catchment was 'very poor' to 'fair'. The key water quality issues of concern in this area of the river are algal blooms. The causes are due to poor flushing of the river (due to water extraction upstream) and high continuous nutrient inputs from upstream sources such as South Creek and to a lesser extent Cattai Creek.

A truck drainage report for the Bona Vista and Fernadell sites had previously been submitted to Hawkesbury Council for approval. This report indicates that the majority of surface runoff from the Bona Vista site will gravitate to a drainage swale to be constructed as shown in *Figure 4*. In regard to the proposed Water Recycling Facility site, it is

expected that surface water can be locally managed via culverts and swales – details of which will be provided in the secondary development application dealing with the Water Recycling Facility itself.



Figure 4: Location of Overland Flow Path relative to subject Water Recycling Facility allotment

4.2.2 Groundwater

There is limited information on groundwater in the Pitt Town area. The Pitt Town LES indicated that the salinity of the groundwater was likely to be elevated and there were localised areas of higher water table. The LES reported on a study on the Fernadell and Bona Vista properties by Golder Associates that identified ground water to be from 0.2m below the surface in drainage lines to about 1m below the surface for the majority of the two properties. The geotechnical study undertaken for the adjoining Pump Station T site encountered seepage to a depth of 0.7m - 2m in several of the test pits.

4.2.3 Flooding

The widespread flooding and flood behaviour of the Hawkesbury-Nepean valley presents a significant risk to persons and property in the region. The Hawkesbury-Nepean Flood Emergency State Plan establishes the framework for flood evacuation and the State Emergency Services' position is that the existing flood risk should not be increased by development.

The subject site is below the 1:100 year flood level (17.3m AHD) as shown in Figure 5.

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Figure 5: Location of 1:100 year flood line relative to subject Water Recycling Facility allotment

4.2.4 Ecology

The subject site is located within an area of land known as a remnant Shale Gravel Transition Forest in the Sydney Basin Bioregion (SGTF), an Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1995*. This community is not listed under the *Environmental Conservation and Biodiversity Conservation Act 1999*. The area that would be occupied by the Water Recycling Facility contains remnant trees of the SGTF with very little understorey vegetation.

A copy of the ecological assessment conducted for the immediately adjacent Sewer Pump Station T site and rising main (included in the Review of Environmental Factors approved by Council for the construction of this adjoining pump station) is attached in *Appendix D*. It is considered that this ecological assessment would be relevant to this subdivision proposal as it is for sewer infrastructure, immediately adjacent to the existing pump station site and is within the same vegetation community. It is expected that once location details of the Water Recycling Facility structures are more definite, the secondary development application (ie for the facility itself) will provide a detailed and more specific ecological impact analysis.

A suite of likely mitigation measures are listed in Section 7.2.4 of this submission.

4.2.5 Traffic and Accessibility

The site is located at the intersection of Bootles Lane and Johnston Street. Bootles Lane is a formed road whilst Johnston Street is generally unformed in this location (apart from access to the adjoining Sewer Pump Station T site.

During the construction period, the majority of traffic movements to and from the site would comprise truck movements delivering construction materials and removing waste and private vehicle trips made by construction workers.

During the longer term, there would be intermittent truck movements to and from the Water Recycling Facility for maintenance and operational inspections. Details of such movements will be documented in the secondary application for the Water Recycling Facility.

4.2.6 Infrastructure

The site has access at its boundary to electrical and water infrastructure.

5 Proposed Development

The proposed development seeks to subdivide Lot 1062, DP 1131838 (approximately 8.26ha allotment) into:

- proposed Lot 1068, being a 3125sqm, generally rectangular, parcel of land at the intersection of Bootles Lane and Johnston Street (and adjacent to an existing Council Sewer Pump Station on Lot 1061, DP 1131838) for the purpose of a Water Recycling Facility.
- 2. proposed Lot 1067, being a residue lot of 7.943ha in area.

Proposed Lot 1068 will have no dwelling entitlement.

This application only seeks consent for the subdivision of the land to facilitate the Water Recycling Facility, as shown in **Appendix A**. The Water Recycling Facility itself does not form part of this application as such details will be documented in a secondary development application. However, an overview of the Water Recycling Facility is provided in *Section 5.1* of this submission for information purposes only.

It is necessary to position the Water Recycling Facility in this location, and hence create proposed Lot 1068, for the following reasons:

- 1. Its in an ideal topographical location, being the lowest point of the site
- 2. The site minimises vegetation disturbance
- Its adjacent to a Council sewer pump station asset for a number of reasons including ease of extracting sewage from this Council infrastructure during initial phases
- 4. It has access to existing infrastructure and services

5.1 The Water Recycling Facility – For General Information Only

This section is provided for information only and does not form part of this proposal. As outlined throughout this submission, this application only seeks consent for the subdivision of the land to enable the establishment of a Water Recycling Facility. The Water Recycling Facility will be documented within a secondary (and separate) Development Application which will be submitted at a later date.

Figure 6 and *Figure 7* follow which outline the expected general arrangement of the Water Recycling Facility structures on the subject land, subject to further investigations and approvals.

This site, and building arrangement, has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact.

The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non-reflective building materials. The height of the facility is expected to be 6m and again reflects the height of other nearby dwelling structures in the vicinity. This is expected to reduce visual impact and maintain the semi-rural village character of Pitt Town.

Supplementary planting will be proposed, including screen plantings to reduce visual effect.


Figure 7: Preliminary Photomontage of Water Recycling Facility – For Information Only (Proposed site arrangement subject to investigations and approvals)

6 Approvals, Permits and Licences

6.1 General

The proposed subdivision requires several approvals, consents, licences, permits or permissions from various government departments, pursuant to legislation other than the EP&A Act.

This section outlines relevant other legislation including the approvals, licences and permits which may need to be sought concurrently with the subject DA. This outline is structured under headings relating to the responsible approval authorities.

6.2 Department of Planning (DoP)

A SEPP 1 submission accompanies this Development Application as the subdivision of the land, for the purpose of a Water Recycling Facility, does not comply with the minimum lot size criteria for the Environmental Protection – Agriculture Protection zone as outlined in the Hawkesbury Local Environmental Plan.

No dwelling entitlement will apply to the proposed Water Recycling Facility site.

DoP's concurrence to the attached SEPP 1 Objection (Appendix E) is required.

6.3 Department of Environment, Climate Change and Water (DECCW)

6.3.1 National Parks and Wildlife Act (NPWA) 1974

Section 90 of the NPWA requires a permit to be granted by DECCW for any works likely to destroy, deface, damage or knowingly cause or permit the destruction or defacement of a relic or Aboriginal place or object. In addition, section 87 requires a permit where it is intended to undertake salvage excavation relating to any Aboriginal object.

A Section 90 approval has been issued by DECCW for the Bona Vista site. Correspondence from DECCW is attached in **Appendix F**.

6.3.2 Threatened Species Conservation Act (TSCA) 1995

The TSCA contains provisions requiring the identification of any vulnerable or endangered flora or fauna species, populations or ecological communities associated with a proposed development. Furthermore, if that proposal is considered to have a significant impact, the TSCA requires that appropriate recovery and management strategies be implemented.

An Endangered Ecological Community is found on the subject site. Whilst no earthworks are required to enable registration of this subdivision proposal, the impact of the future Water Recycling Facility has been considered as part of this application and a supporting ecological review is attached in **Appendix D**. It is expected that once location details of the Water Recycling Facility structures are more definite, the secondary development application (ie for the facility itself) will provide a detailed and more specific ecological impact analysis.

A suite of likely mitigation measures are listed in Section 7.2.4 of this submission.

6.4 Department of Water and Energy

6.4.1 Water Management Act (WMA) 2000

The object of the WMA is the "sustainable and integrated management of the State's water for the benefit of both present and future generations". The WMA includes many provisions which were previously under the *Rivers and Foreshores Improvement Act 1948* (RFIA) prior to its repeal, including those provisions regarding licences and approvals.

Part 3 of Chapter 3 of the WMA relates to Approvals and section 91(2) requires a 'controlled activity approval' for works at a specified location in, on or under 'waterfront land'.

No development occurs near 'waterfront land' and therefore no further action is required in this regard.

6.5 NSW Heritage Office

6.5.1 Heritage Act 1977

The *Heritage Act 1977* contains provisions relating to the protection of items of heritage significance or items of potential significance.

Amongst other things, the Act requires that the approval of the Heritage Council be obtained prior to undertaking any development likely to have an impact on an item listed in the State Heritage Register, to which an interim heritage order applies or, under sections 139-140, which involves excavation of land where there is reasonable cause to expect that a relic will be discovered or disturbed.

No works are proposed in this application that will affect items protected by the *Heritage Act* 1977 and therefore no further action is required in this regard.

6.6 NSW Rural Fire Service

6.6.1 Rural Fires Act 1997

Section 100B of the RFA, in conjunction with section 79BA of the EP&A Act, requires a 'bushfire safety authority' to be issued by the Commissioner of the NSW Rural Fire Service, for subdivision of bushfire prone land that could lawfully be used for residential or rural residential purposes or for development of bushfire prone land for a 'special fire protection purpose'.

The proposal is not for residential or rural residential purposes and therefore no further action is required in this regard.

6.7 NSW Roads and Traffic Authority

6.7.1 Roads Act 1993

Section 91(1) of the EP&A Act provides that development is integrated development if it requires consent under section 138(1) of the *Roads Act 1993* to:

- "(a) erect a structure or carry out a work in, on or over a public road, or
- (b) dig up or disturb the surface of a public road, or
- (c) remove or interfere with a structure, work or tree on a public road, or
- (d) pump water into a public road from any land adjoining the road, or
- (e) connect a road (whether public or private) to a classified road".

No roads, as defined in the *Roads Act 1993*, will be affected by this proposal and therefore the proposed works do not trigger the integrated development provisions of the EP&A Act in this instance.

7 Environmental Planning Assessment

This section provides an environmental assessment of the proposed development in respect of the relevant matters for consideration under Section 79C(1) of the Environmental Planning and Assessment Act, 1979 (EP&A Act).

7.1 Section 79C(1)(a) – Planning Controls

Under Section 79C(1)(a) of the EP&A Act, the consent authority must take into consideration the provisions of:

- Section 79C(1)(a)(i) Environmental Planning Instruments;
- Section 79C(1)(a)(ii) Draft Environmental Planning Instruments;
- Section 79C(1)(a)(iii) Development Controls Plans;
- Section 79C(1)(a)(iiia) Planning Agreements; and
- Section 79C(1)(a)(iv) the Regulations.

The relevant environmental planning instruments and development controls plans are:

- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008
- State Environmental Planning Policy 19 Bushland in Urban Areas;
- State Environmental Planning Policy 55 Remediation of Land;
- SREP 20 Hawkesbury-Nepean River (No 2 1997);
- Hawkesbury Local Environmental Plan 1989;
- Draft Hawkesbury Local Environmental Plan 2009;
- Hawkesbury Development Control Plan.

The remainder of this subsection provides an assessment of the proposal in regard to the above mentioned plans, policies and other relevant matters.

7.1.1 State Environmental Planning Policies

7.1.1.1 SEPP (Infrastructure) 2007

SEPP (infrastructure) 2007 came into effect on 1 January 2008, which establishes the planning approvals path for infrastructure. In this regard, Clause 106 of Part 3, Division 18 – Sewage System states, in part, that:

"Development for the purpose of water recycling facilities may be carried out:

- (a) by or on behalf of a public authority or any person licensed under the Water Industry Competition Act 2006 without consent on land in a prescribed zone, and
- (b) by any other person with consent on land in a prescribed zone or on any land where the development is ancillary to an existing land use."

A prescribed zone is "any of the following land use zones or a land use zone that is equivalent to any of those zones:

(b) RU2 Rural Landscape"

The current zone, pursuant to Hawkesbury LEP 1989 is Environmental Protection – Agriculture Protection. The proposed zone, pursuant to Draft Hawkesbury LEP 2009 is RU2 Rural Landscape. Therefore, the existing (and future) zone is deemed to be a prescribed zone for the purposes of this SEPP.

The proposed Water Recycling Facility works are defined as a *facility for the treatment of* sewage effluent, stormwater or waste water for use as an alternative supply to mains water, groundwater or river water (including sewer mining works), whether the facility stands alone or is associated with other development, and includes associates:

- (a) retention structures, and
- (b) treatment works, and
- (c) irrigation schemes

The purpose of this application is to seek subdivision consent so that the required land can be subdivided off to give title to a licensed authority under WICA 2006 legislation to enable them to erect a Water Recycling Facility to service sewer demands of Vermont Pitt Town. Whilst this application is purely for subdivision, SEPP (Infrastructure) 2007 was considered in the context of the sites intended use.

7.1.1.2 SEPP (Major Projects) Amendment (Pitt Town) 2008

Whilst the subject land did not form part of this SEPP Amendment, the gazetted rezoning illustrated (by red hatching) a strip of conservation area along the Johnston Street frontage. Therefore this SEPP needs to be considered as part of this application.

The non-indigenous conservation area nominated on this plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street. We understand that this was inserted as a result of an independent Local Environmental Study Council commissioned for Hawkesbury LEP Amendment 145 relating to the Pitt Town lands.

The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain under this proposal and therefore it is unlikely that this subdivision will create adverse impacts on this non-indigenous conservation area.

7.1.1.3 SEPP No. 19 - Bushland in Urban Areas

SEPP 19 applies to the Urban Areas of the Hawkesbury Local Government Area. This subdivision proposal is not located on urban zoned land and therefore, whilst this policy was reviewed and considered in preparing this subdivision application, it was deemed not applicable in this instance.

7.1.1.4 SEPP 55 – Remediation of Land

SEPP 55 introduces state-wide planning controls for the remediation of contaminated land and provides that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, appropriate remediation is to be undertaken before the land is developed.

Contamination investigations conducted on the Bona Vista site indicated there would be a low risk of buried materials (such as underground tanks or potential fill). This subdivision proposal is considered acceptable with respect to SEPP 55 as, similar to the neighbouring Sewer Pump Station T site, affects from contamination are likely to be negligible.

7.1.1.5 SREP 20 – Hawkesbury-Nepean River (No 2 – 1997)

The Sydney Regional Environmental Plan No 20 — Hawkesbury-Nepean River (SREP 20) applies to the Hawkesbury Local Government area. Under the EPA Act SREP 20 is now a deemed SEPP and is still a relevant environmental planning instrument to be considered.

The aim of the Plan is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

Part 2 of the plan sets out considerations, policies and strategies that must be taken into consideration in the preparation of an environmental planning instrument, development control plan or the assessment of an application for development. Part 3 of the SREP

contains the development controls that are imposed by the plan and identifies types of development that are of particular concern due to their potential impacts.

Under Clause 5, general planning considerations must be taken into account as part of the assessment, as described in **Table 1**.

Table 1: General planning considerations under SREP 20

General Planning Consideration	Response
The aim of this plan and the strategies listed in the Action Plan of the Hawkesbury-Nepean Environmental Planning Strategy	The proposed subdivision will enable a Water Recycling Facility, pursuant to SEPP (infrastructure) 2007, to be erected which will provide sewage disposal and non-potable water infrastructure for new dwellings in the Vermont Pitt Town release area.
Whether there are any feasible alternatives to the development or other proposal concerned	The Part 3A approved Vermont Pitt Town release area, for 943 residential lots, needs to be serviced. The proposed subdivision excises a parcel of land off from the parent lot adjacent to the new Sewer Pump Station T site. This site has been located with respect to minimising environmental impact, co-locating services and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. As mentioned in <i>Section 2.2</i> , the alternative solution would be to comply with the Council October 2008 sewer strategy at an estimated cost of \$21.35 million. However, this cost is inequitable and prohibitive for the development of Vermont Pitt Town so this alternative solution is not feasible. There are therefore no other alternatives.
The relationship between the different impacts of the development or other proposal and the environment, and how those impacts will be addressed and monitored	There are no expected impacts as a direct result of this application, being purely the subdivision of the land. Potential environmental monitoring associated with the activity of the land (ie the Water Recycling Facility) will be protected by WICA 2006 license conditions imposed on the authority responsible for managing this Water Recycling Facility.

Under Clause 6 of SREP 20, specific planning considerations must be taken into account as part of the assessment of this proposal, as described in **Table 2**.

Table 2: Specific planning considerations under SREP 20

Specific Planning Consideration	Response
Total Catchment Management	There are no expected impacts as a direct result of
Environmentally Sensitive Areas	Potential environmental monitoring associated with
Water Quality	the activity of the land (ie the Water Recycling Facility) will be protected by WICA 2006 license conditions imposed on the authority responsible for managing this Water Recycling Facility.

Specific Planning Consideration	Response
Cultural Heritage	A Section 90 permit has been granted by DECC in relation to the Bona Vista site (see Appendix F). The proposal does not detract from the significance of conservation items.
Flora and Fauna	As shown in the preliminary Water Recycling Facility
Riverine Scenic Protection	the structures are proposed to be located in generally cleared areas causing minimal environmental clearing or disturbance.
	The Water Recycling Facility building is to look like a dwelling structure for aesthetic reasons to ensure that it is not obtrusive but blends with the bulk and scale of existing buildings in the vicinity. Large setbacks are proposed. Non-reflective building material is expected to be used.
	Supplementary planting (including screen planting) will be proposed in the secondary application that seeks approval for the Water Recycling Facility.
Agriculture / aquaculture and fishing	We understand that the subject land is not described as Class 1,2 or 3 Agricultural land.
Rural residential development	Not applicable. No dwelling entitlement is proposed
Urban development	
Recreation and tourism	The residue allotment still enables opportunities for recreation and tourism activities
Metropolitan Strategy	Potential environmental monitoring associated with the activity of the land (ie the Water Recycling Facility) will be protected by WICA 2006 license conditions imposed on the authority responsible for managing this Water Recycling Facility. One would expect such conditions would relate to noise, odour, air quality, water quality etc.

7.1.2 Hawkesbury Local Environmental Plan 1989

Pursuant to clause 8 of Hawkesbury LEP 1989, the site is zoned Environmental Protection – Agriculture Protection. An extract of the zoning map is below in **Figure 8**.



Figure 8: Existing Zoning Plan extract

Table 3 sets out an assessment of the proposed development against the provisions of Hawkesbury LEP 1989.

Table 3: Assessment against Hawkesbury LEP 1989

LEP Provision	Assessment	Consistency
 Clause 2 Aims & Objectives (a) Provide for management, orderly and economic development (b) Area, location and quality of land (c) Protect attractive landscapes (d) Conserve and enhance heritage buildings, structures and sites (e) Opportunities for secure, appropriate and affordable housing 	 This subdivision proposal is considered to be consistent with the aims and objectives of the Hawkesbury LEP, in particular: (a) Enables the land to be transferred to a licensed sewer authority (as defined by WICA legislation) for the establishment of cost effective sewer infrastructure to service Vermont Pitt Town; (b) The subdivision enables an environmentally responsible solution to servicing Vermont Pitt Town via the reuse of treated non-potable water; (c) The land, adjacent to a newly constructed Hawkesbury Council sewer pump station asset, is considered appropriate for its future Water Recycling Facility use; (d) This site has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact (e) As outlined in the Council report from 25 August 2008, the alternative sewer solution reduces infrastructure costs and improves the viability of Vermont Pitt Town (f) No dwelling entitlement is required for the proposed Water Recycling Facility allotment 	Consistent
Clause 9 Carrying out of development	Water Recycling Facilities are covered by the SEPP (Infrastructure) 2007 and do not require development consent in a prescribed zone	Consistent

LEF	Provision	Assessment	Consistency
Cla (a)	use 9A Zone Objectives To protect the agricultural potential of rural land in	Whilst the proposed subdivision does not meet the minimum lot size standard for the Environment Protection – Agricultural Protection zone, the proposal	Consistent
	order to promote, preserve and encourage agricultural	does not detract from the main objectives of the zone.	
(1-)	production,	Potential environmental monitoring associated with the	
(D)	activities occur in a	be protected by WICA 2006 license conditions imposed	
	manner:	on the authority responsible for managing this Water	
	have a significant	would relate to noise, odour, air quality, water quality	
	adverse effect on water	etc.	
	catchments,	As the proposed site is adjacent to an existing Sewer	
	and groundwater	no rural land use conflicts will occur.	
	quality and flows,	This site has been located with respect to minimising	
	conditions and	environmental impact, co-locating services, topography	
	important	and accessibility. Little opportunity exists to locate this	
	as streams and	causing increased environmental impact.	
	b. That satisfies	Supplementary planting will be proposed, including	
	best practice	screen plantings to reduce visual effect. The Water	
	best practice	replicate a dwelling house with large setbacks to	
	management	Bootles Lane and Johnston Street and the use of non-	
c)	To ensure that	visual effect. Note that no dwelling entitlement will be	
	development does not create or contribute to rural	given to the subject land.	
(-1)	land use conflicts,	The proposal is not for a traffic generating development	
(a)	development retains or	on an artenai road.	
	enhances existing landscape values that	No outdoor advertising is proposed	
	include a distinctly	The proposed subdivision has access to electrical and	
e)	agricultural component, To preserve river valley	ensuring the viability of the Vermont Pitt Town	
	systems, scenic corridors,	development.	
	escarpments,		
	environmentally sensitive areas and other local		
(£)	features of scenic quality,		
(1)	lines, river valleys, rural		
	landscapes and other local features of scenic		
	significance,		
(g)	I o prevent the establishment of traffic		
	generating development		
(h)	To control outdoor		
	advertising so that it does		
·- \	landscape,		
(1)	development does not		
	create unreasonable		
	provision or extension of		
	public amenities or services,		
j)	To preserve the rural		
	area by controlling the		
	choice and colour of building materials and the		
	position of buildings,		

access roads and landscaping, to encourage

LEP Provision	Assessment	Consistency
Clause 10 Subdivision – general (1) Subdivision only with consent (2)-(4) Lot boundaries to coincide with zone boundaries (5) Lot sizes and density controls (6) SEPP No 1 applies	 This SoEE accompanies a Development Application for subdivision. The proposed subdivision corresponds with the zone boundaries. The subject land falls outside of the Pitt Town Site, as defined in the LEP. Lot sizes do not comply with the Minimum Lot Size and a SEPP No 1 submission has been included within this SoEE submission. No dwelling entitlements are proposed for the Water Recycling Facility allotment 	Consistent
Clause 11 Rural subdivision – general provisions (1) Definitions (2) Lot size (as shown on map) (3) Subdivision provisions a) Depth to frontage ratio b) Lot pattern to minimise impacts c) On site disposal d) Building envelopes (4) & (4A) Not relevant (5) Not relevant (6) Building envelope above 100yr flood level (7) -(9) Not relevant	The proposed subdivision does not meet the minimum 10ha lot size standard for the Environment Protection – Agricultural Protection zone. A SEPP 1 objection has been attached. The proposed subdivision boundaries of the Water Recycling Facility allotment are generally rectangular in shape allowing the proposed infrastructure to be cited on the land with appropriate setbacks. The proposed Water Recycling Facility allotment is below the 1:100 year flood line (17.3mAHD), however no dwelling entitlement is proposed. The secondary application that provides details of the Water Recycling Facility will address the flood level however it is expected that the structure will be slightly elevated above the flood level similar to the adjoining Council Sewer Pump Station T site.	Inconsistent – Refer attached SEPP 1 objection
Clause 15 Erection of Dwelling Houses	No dwelling entitlements are proposed for the proposed Water Recycling Facility allotment	Consistent
Clause 18 Provision of water, sewerage etc services	Water and electricity services are available to the boundary of the subject site.	Consistent
Clause 20 Development below high water mark etc	No development is proposed below the high water mark or within 40m of the River	Consistent
Clause 24 Development in certain environmental and other zones	No dwelling entitlements are proposed for the proposed Water Recycling Facility allotment. The Water Recycling Facility building, to be addressed in a secondary development application, is expected to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non-reflective building materials. As shown on preliminary plans in this submission, the height of the Water Recycling Facility is expected to be 6m.	Consistent
Clause 25 Development of flood liable land	The proposed Water Recycling Facility allotment is below the 1:100 year flood line (17.3mAHD), however no dwelling entitlement is proposed. The secondary application that provides details of the Water Recycling Facility will address the flood level however it is expected that the structure will be slightly elevated above the flood level similar to the adjoining Council Sewer Pump Station T site.	Consistent

LEP Provision	Assessment	Consistency
Clause 26 Conservation areas	No dwelling entitlements are proposed for the proposed Water Recycling Facility allotment.	Consistent
	A Section 90 permit has been issued in relation to the whole of the Bona Vista site (inclusive of the subject land).	
	The proposal does not detract from the significance of non-indigenous conservation items.	
	The Water Recycling Facility building, to be addressed in a secondary development application, is expected to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non-reflective building materials. As shown on preliminary plans in this submission, the height of the Water Recycling Facility is expected to be 6m.	
Clause 27 Heritage items	This application seeks Council's consent to subdivide the land for the purpose of a Water Recycling Facility, as defined in SERP (Infrastructure) 2007	Consistent
Clause 28 Development in the vicinity of heritage items	The non-indigenous conservation area shown by red hatching on the heritage plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street. We understand that this was inserted as a result of an independent Local Environmental Study Council commissioned for Hawkesbury LEP Amendment 145 relating to the Pitt Town lands.	
	The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain and therefore it is unlikely that this subdivision will also create adverse impacts on this non-indigenous conservation area.	
Clause 36 Clearing of land in certain environmental and other zones	This application is purely for the subdivision of the land to enable the installation of a Water Recycling Facility. No earthworks are proposed under this application. Details of the Water Recycling Facility will be included in a secondary application which will seek any approvals required to clear fell trees or fill surface levels.	Consistent
Clause 37A Acid Sulfate Soils	A geotechnical investigation has been carried out by Golder Associates and a report issued; <i>Geotechnical</i> <i>Investigation Proposed Residential Development Pitt</i> <i>Town, NSW</i> dated June 2005 (see Appendix C). There are no known acid sulphate soils on the site.	Consistent
Clause 54 Pitt Town – heritage	A Section 90 permit has been issued in relation to the whole of the Bona Vista site (inclusive of the subject land).	Consistent
	The non-indigenous conservation area shown by red hatching on the heritage plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street.	
	The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain and therefore it is unlikely that this subdivision will also create adverse impacts on this non-indigenous conservation area.	

7.1.3 Draft Hawkesbury LEP 2009

The draft Hawkesbury LEP 2009 has been placed on public exhibition from 5 February 2010 to 12 April 2010. Any development application lodged with Council after the commencement of the exhibition period must also consider this draft LEP.

Therefore, pursuant to clause 2.2 of draft Hawkesbury LEP 2009, the site is proposed to be zoned RU2 Rural Landscape. An extract of the zoning map is below in **Figure 9**.



Figure 9: Proposed Zoning Plan extract (Draft Hawkesbury LEP 2009)

 Table 4 sets out an assessment of the proposed development against the provisions of draft Hawkesbury LEP 2009.

Table 4: Assessment a	against	Draft	Hawkesbury	LEP	2009
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LEP Provision	Assessment	Consistency
 Clause 1.2 Aims of the Plan (a) To provide the mechanism for the management, orderly and economic development and conservation of land within Hawkesbury, (b) To provide appropriate land in area, location and quality for living, working and recreational activities and agricultural production, (c) To protect attractive landscapes and preserve places of natural beauty, including wetlands and waterways, (d) To protect and enhance the natural environment in Hawkesbury and to encourage ecologically sustainable development, (e) To conserve and enhance buildings, structures and sites of recognised significance which are part of the heritage of Hawkesbury for future generations, and (f) To provide opportunities for the provision of secure, appropriate and affordable housing in a variety of types and tenures for all income groups within Hawkesbury 	 This subdivision proposal is considered to be consistent with the aims and objectives of the Hawkesbury LEP, in particular: (a) Enables the land to be transferred to a licensed sewer authority (as defined by WICA legislation) for the establishment of cost effective sewer infrastructure to service Vermont Pitt Town; (b) The subdivision enables an environmentally responsible solution to servicing Vermont Pitt Town via the reuse of treated non-potable water; (c) The land, adjacent to a newly constructed Hawkesbury Council sewer pump station asset, is considered appropriate for its future Water Recycling Facility use; (d) This site has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. (e) As outlined in the Council report from 25 August 2008, the alternative sewer solution reduces infrastructure costs and improves the viability of Vermont Pitt Town (f) No dwelling entitlement is required for the proposed Water Recycling Facility allotment 	Consistent
Clause 2.6 Subdivision – Consent requirements	This SoEE accompanies a Development Application seeking consent for subdivision. No dwelling entitlements are proposed for the Water Recycling Facility allotment	Consistent
2.6C Earthworks	No earthworks are proposed as part of this subdivision application.	Consistent

LEP Provision	Assessment	Consistency
 LEP Provision RU2 Rural Landscape Zone Objectives (a) To encourage sustainable primary industry production by maintaining and enhancing the natural resource base (b) To maintain the rural landscape character of the land (c) To provide for a range of compatible land uses, including extensive agriculture (d) To minimise the fragmentation and alienation of resource land (e) To minimise conflict between land uses within the zone and land uses within adjoining zones (f) To ensure that agricultural activities occur in a manner that do not have a significant adverse effect on water catchments, including surface and groundwater quality and flows; land surface conditions and important ecosystems such as streams and wetlands (g) To ensure that development retains or enhances existing landscape values which includes a distinctive agricultural component (h) To preserve the river valley systems, scenic corridors, wooded ridges, escarpments, environmentally sensitive areas and other features of scenic quality (i) To protect hilltops, ridge lines, river valleys, rural landscape and other local features of scenic significance (i) To prevent the establishment of traffic generating developments along main and arterial roads (k) To control outdoor advertising so that it does not disfigure the rural landscape (ii) To encourage existing sustainable agricultural activities (ii) To encourage tourism related development that will not have significant adverse 	Assessment The subject land is not prime agricultural production land that would sustain a primary industry or extensive agricultural activities. The parent lot is already an undersized parcel of land. Whilst the proposed subdivision does not meet the minimum lot size standard for the Environment Protection – Agricultural Protection zone, the proposal does not detract from the main objectives of the zone. Potential environmental monitoring associated with the activity of the land (ie the Water Recycling Facility) will be protected by WICA 2006 license conditions imposed on the authority responsible for managing this Water Recycling Facility. One would expect such conditions would relate to noise, odour, air quality, water quality etc. As the proposed site is adjacent to an existing Sewer Pump Station (operated by Council) it is expected that no rural land use conflicts will occur. This site has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. Supplementary planting will be proposed, including screen plantings to reduce visual effect. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non-reflective building materials – again to assist in reducing visual effect. Note that no dwelling entitlement will be given to the subject land. No outdoor advertising is proposed The proposed subdivision has access to electrical and water reticulation supplies. The development assists in ensuring the viability of the Vermont Pitt Town development.	Consistent
environmental effects or conflicts with other land uses in the locality		
4.1 Minimum subdivision lot size	The proposed subdivision does not meet the minimum 10ha lot size standard for the	Inconsistent – Refer attached
	Environment Protection – Agricultural Protection zone. A SEPP 1 objection has been attached.	SEPP 1 objection

LEP Provision	Assessment	Consistency
4.2 Rural Subdivision	This clause permits subdivision, for the purpose of primary protection, smaller than the minimum lot size provided there are no dwelling entitlements. This application is for subdivision smaller than the minimum lot size, and without dwelling entitlement, but nor for the purpose of primary protection. Therefore this clause does not apply to this application.	Not applicable.
4.2A Erection of dwelling houses on land in certain rural and environment protection zones	No dwelling entitlements are proposed for the proposed Water Recycling Facility allotment	Consistent
4.3 Height of Buildings	The maximum height of buildings on this site is 10m. Whilst this application does not seek approval for buildings, it is noted in <i>Figure 6</i> from <i>Section 5.1</i> that the proposed structures on the land are 6m and 5m respectively and therefore would comply with this height restriction.	Consistent
4.6 Exceptions to Development Standards	 This clause in the draft LEP replaces SEPP 1 (as SEPP 1 will no longer be applicable once this draft LEP is endorsed). It appears as though this subdivision proposal does not comply with sub-clause 6 of this clause being: Consent must not be granted under this clause for a subdivision of land in ZoneRU2 if: (a) the subdivision will result in 2 of more lots of less than the minimum area specified for such lots by a development standard, or (b) the subdivision will result in at least one lot that is less than 90% of the minimum area specified for such a lot by a development standard The parent lot, at approximately 8.25ha, is already less than the minimum lot size for this zone. Therefore, it would be impossible for this proposal to comply with the SEPP (Infrastructure) 2007 and, whilst the subdivision does not meet the development standard, compliance with the standard is unreasonable and unnecessary in the circumstances of this case. There are sufficient planning grounds to justify contravening the development standard. 	Inconsistent
5.9 Preservation of trees or vegetation	This application is for subdivision purposes only. No clearing works are required to register a plan of subdivision created by this proposal. Section 5.1 (<i>Figure 6</i>) of this submission illustrates 8 existing trees would be affected by the installation of the Water Recycling Facility. However details of the Water Recycling Facility, any tree removal / replacement, will be provided in a secondary development application	Consistent

LEP Provision	Assessment	Consistency
5.10 Heritage conservation	This application seeks Council's consent to subdivide the land for the purpose of a Water Recycling Facility, as defined in SEPP (Infrastructure) 2007.	
	The non-indigenous conservation area shown by red hatching on the heritage plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street. We understand that this was inserted as a result of an independent Local Environmental Study Council commissioned for Hawkesbury LEP Amendment 145 relating to the Pitt Town lands.	
	The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain under this proposal and therefore it is unlikely that this subdivision will create adverse impacts on this non-indigenous conservation area.	
6.3 Development on land identified on Acid Sulphate Soils Planning Map	A geotechnical investigation has been carried out by Golder Associates and a report issued; <i>Geotechnical Investigation Proposed Residential</i> <i>Development Pitt Town, NSW</i> dated June 2005 (see Appendix C). There are no known acid sulphate soils on the	Consistent
6.7 Flood Planning	site.	Consistent
0.7 Flood Flamming	The proposed Water Recycling Facility allotment. The proposed Water Recycling Facility allotment is below the 1:100 year flood line (17.3mAHD), however no dwelling entitlement is proposed. The secondary application that provides details of the Water Recycling Facility will address the flood level however it is expected that the structure will be slightly elevated above the flood level similar to the adjoining Council Sewer Pump Station T site.	CONSIGN
6.8 Pitt Town Heritage	A Section 90 permit has been issued in relation to the whole of the Bona Vista site (inclusive of the subject land).	Consistent
	The non-indigenous conservation area shown by red hatching on the heritage plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street.	
	The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain and therefore it is unlikely that this subdivision will also create adverse impacts on this non-indigenous conservation area.	

7.1.4 Hawkesbury Development Control Plan 2000

Hawkesbury Development Control Plan (DCP) contains detailed provisions relating to numerous aspects of development including subdivision. The following table provides an assessment of the proposed development against the relevant provisions of the DCP (see **Table 5**).

Table 5: Proposal's consistency with Hawkesbury DCP

DCP Provision	Assessment	Consistency
Part C –General Guidelines		
Chapter 1 Landscaping	As outlined in this submission, a secondary application will be submitted detailing the installation of the Water Recycling Facility on the land created by this subdivision proposal. Landscaping details are best provided as part of this secondary submission once detail design of the Water Recycling Facility has commenced. It is expected that there will be screen landscaping, utilising appropriate screen plants, installed around the boundaries of the site for visual and aesthetic purposes.	Consistent
Chapter 2 Carparking	Appropriate offsite parking / unloading facilities and turning areas will be provided on site. Details will be provided in the secondary application relating to the Water Recycling Facility	Consistent
Chapter 3 Signs	No signage is proposed	Consistent
Chapter 4 Soil Erosion and Sediment Control	No earthworks are proposed as part of this subdivision proposal. Details of erosion and sediment control will be outlined in a Construction Management Plan to be provided in the secondary application relating to the Water Recycling Facility. It is expected that erosion and sediment control will be addressed on site utilising best practice techniques.	Consistent
Chapter 5 Bushfire Prone Land	The subject land is bushfire prone. However, as there are no dwelling entitlements proposed on the Water Recycling Facility allotment, the proposal does not need to be referred to Rural Fire Service for approval.	Consistent
Chapter 6 Energy Efficiency	As this subdivision is not for the purpose of residential use, this chapter does not apply.	Consistent
Chapter 7 Effluent Disposal	This application seeks subdivision approval to enable a Water Recycling Facility to be established on the allotment. This Facility and its operator will be licensed under WICA legislation and governed by IPART. The future 943 residential lots associated with the Vermont Pitt Town release area can be connected to this Water Recycling Facility by conventional means, therefore complying with this Chapter of the DCP.	Consistent
Chapter 8 Management of Construction and Demolition Waste	This application is for subdivision with no earthworks required. The secondary application detailing the Water Recycling Facility will address the management of construction and removal of construction waste via a Construction Management Plan to be submitted as part of this secondary application.	Consistent

DCP Provision	Assessment	Consistency
Part D – Specific Development		
Clause 3.2 Flora and Fauna	 Whilst this application does not seek to conduct any earthworks associated with the Water Recycling Facility, an ecology assessment has been prepared and accompanies this submission. The proposed Water Recycling Facility structures will be positioned to have the least impact on the ecology of the site. As a result, it is estimated that approximately 8 trees need to be removed to enable the construction and operation of the Water Recycling Facility, which will also be detailed in the secondary application relating to the Water Recycling Facility. The removal of 8 trees is unlikely to have an adverse impact on faunal movement through the subject land. 	Consistent
Clause 3.3 Visual Amenity	The subdivision will have insignificant impact on views and vistas in this locality. In relation to the Water Recycling Facility, supplementary planting will be proposed, including screen plantings to reduce visual effect. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non- reflective building materials – again to assist in reducing visual effect. Note that no dwelling entitlement will be given to the subject land.	Consistent
lause 3.4 Heritage	This application seeks Council's consent to subdivide the land for the purpose of a Water Recycling Facility, as defined in SEPP (Infrastructure) 2007. The non-indigenous conservation area shown by red hatching on the heritage plan reflects a previous fence line boundary extending the length of the un-formed Johnston Street. We understand that this was inserted as a result of an independent Local Environmental Study Council commissioned for Hawkesbury LEP Amendment 145 relating to the Pitt Town lands. The approval and installation of the adjoining Council Sewer Pump Station, and its associated subdivision, was deemed to have little impact on this conservation area. It is likely that the fence line will remain under this proposal and therefore it is unlikely that this subdivision will create adverse impacts on this non-indigenous conservation area.	Consistent
Clause 3.5 Utility services	The subdivision does not permit a residential use and therefore, whilst electrical and water infrastructure is available to this site, this clause is deemed to not apply to this proposal.	Consistent

DCP Provision	Assessment	Consistency
Clause 3.6 Flooding, landslip & contaminated land	Golder Associates have produced a report that indicates the land is unlikely to be affected by contaminated land. No dwelling entitlements are proposed for the proposed Water Recycling Facility allotment. The proposed Water Recycling Facility allotment is below the 1:100 year flood line (17.3mAHD), however no dwelling entitlement is proposed. The secondary application that provides details of the Water Recycling Facility will address the flood level however it is expected that the structure will be slightly elevated above the flood level similar to the adjoining Council Sewer Pump Station T site.	Consistent
Clause 3.7 Residential Subdivision	Not applicable	Not applicable
Clause 3.8 Rural and Rural-Residential Subdivision	Not applicable	Not applicable
Part E Pitt Town		
Clause 4.1.1 Concept Approvals Requires consideration of the provisions and/or commitments within the Concept Plan approval	Part 3A Approval of the Pitt Town release area did not include the subject land. However, it is noted that this proposal allows a Water Recycling Facility to be established that facilitates the ongoing development of the Vermont Pitt Town release area that is subject to a Part 3A Concept Plan approval.	Not applicable
Clause 4.2 Desired future character New development is to maintain a semi- rural village character with generous setbacks and modified grid urban structure.	In relation to the Water Recycling Facility, supplementary planting will be proposed, including screen plantings to reduce visual effect. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non- reflective building materials – to reduce visual impact and to maintain the semi-rural village character of Pitt Town. Note that the subject Water Recycling Facility allotment will not have a dwelling entitlement.	Consistent

DCP Provision	Assessment	Consistency
Clause 4.3 General Principles	This site has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. Potential environmental monitoring associated with the activity of the land (ie the Water Recycling Facility) will be protected by WICA 2006 license conditions imposed on the authority responsible for managing this Water Recycling Facility. One would expect such conditions would relate to noise, odour, air quality, water quality etc. Supplementary planting will be proposed, including screen plantings to reduce visual effect. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non- reflective building materials – to reduce visual impact and to maintain the semi-rural village character of Pitt Town. The subdivision enables an environmentally responsible solution to servicing Vermont Pitt Town via the reuse of treated non-potable water.	Consistent
Clause 4.4 Land Use	This site has been located with respect to minimising environmental impact, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. Figure E4.2 nominates this location for pump station infrastructure. Therefore, this proposal complies with the intended land use. Golders Associates report on geotechnical and contamination is included in <i>Appendix C</i> .	Consistent
Clause 4.5.2 Lot Design Rules	This clause does not relate to the subject land as it falls outside of the nominated DCP precincts.	Not Applicable
Clause 4.6 Street Design	This clause does not relate to the subject land as no roads are proposed within this application and the land falls outside of the nominated DCP precincts	Not Applicable
Clause 4.7 Bus and Cycle Routes	Clause not applicable as land is not for residential use as no dwelling entitlement is proposed	Not Applicable
Clause 4.8 Community Facilities	Not Applicable	Not Applicable
Clause 4.9 Public Open Space and Recreation	Not Applicable	Not Applicable

DCP Provision	Assessment	Consistency
Clause 4.10 Environmental protection	The proposed Water Recycling Facility structures will be positioned to have the least impact on the ecology of the site. As a result, it is estimated that approximately 8 trees need to be removed to enable the construction and operation of the Water Recycling Facility, which will also be detailed in the secondary application relating to the Water Recycling Facility. The removal of 8 trees is unlikely to have an adverse impact on faunal movement through the subject land. The land is not part of a wetland, nor are new streets proposed.	Consistent
Clause 4.11 Heritage conservation	Historical lot boundaries and fence lines are not expected to be impacted as a result of this subdivision proposal	Consistent
Clause 4.12 Stormwater Management	A truck drainage report for the Bona Vista and Fernadell sites had previously been submitted to Hawkesbury Council for approval. This report indicates that the majority of surface runoff from the Bona Vista site will gravitate to a drainage swale to be constructed as shown in <i>Figure 4</i> . In regard to the proposed Water Recycling Facility site, it is expected that surface water can be locally managed via culverts and swales – details of which will be provided in the secondary development application dealing with the Water Recycling Facility itself. No earthworks are proposed as part of this subdivision proposal. Details of erosion and sediment control will be outlined in a Construction Management Plan to be provided in the secondary application relating to the Water Recycling Facility. It is expected that erosion and sediment control will be addressed on site utilising best practice techniques.	Consistent
Clause 4.13 Utility services	The subdivision does not permit a residential use and therefore, whilst electrical and water infrastructure is available to this site, this clause is deemed to not apply to this proposal.	Consistent
Clause 4.14 Building Envelopes	The controls in this section primarily relate to dwelling building envelopes. No dwelling entitlement is proposed and therefore this clause is not really applicable. However, as outlined in Section 5.1 of this submission, large setbacks to Bootles Lane and Johnston Street are proposed so that the proposed Water Facility remains in keeping with the semi-rural character of the local area.	Consistent

DCP Provision	Assessment	Consistency
Clause 4.15 Building Design	The controls in this section primarily relate to dwelling building design. No dwelling entitlement is proposed and therefore this clause is not really applicable. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non- reflective building materials – to reduce visual impact and to maintain the semi-rural village character of Pitt Town.	Consistent
Clause 4.16 Landscaping	As outlined in this submission, a secondary application will be submitted detailing the installation of the Water Recycling Facility on the land created by this subdivision proposal. Landscaping details are best provided as part of this secondary submission once detail design of the Water Recycling Facility has commenced. It is expected that there will be screen landscaping, utilising appropriate screen plants, installed around the boundaries of the site for visual and aesthetic purposes.	Consistent
Clause 4.17 Fencing	This application does not seek consent for a dwelling entitlement. No fences are proposed as part of this subdivision application.	Consistent

7.2 Section 79C(1)(b) – Natural Environment Impacts

7.2.1 Flooding

The current 100 year ARI flood level is RL 17.3m AHD. The whole of the proposed Water Recycling Facility allotment is below this RL 17.3m AHD flood level (as shown previously in *Figure 5*).

However, as the Water Recycling Facility allotment is not for residential use (ie no dwelling entitlement) it is unlikely to cause impact to persons in a 100 year ARI flood event.

The secondary application that provides details of the Water Recycling Facility will address the flood level in further detail. It is expected that the proposed structure will be slightly elevated above the flood level similar to the adjoining Council Sewer Pump Station T site.

7.2.2 Stormwater and Drainage

As mentioned in *Section 4.2.1*, a truck drainage report for the Bona Vista and Fernadell sites had previously been submitted to Hawkesbury Council for approval. This report indicates that the majority of surface runoff from the Bona Vista site will gravitate to a drainage swale to be constructed as shown in *Figure 4*.

In regard to the proposed Water Recycling Facility site, it is expected that surface water can be locally managed via culverts and swales – details of which will be provided in a Construction Environment Management Plan attached to the secondary development application dealing with the Water Recycling Facility itself.

7.2.3 Water Quality - Soil and Sedimentation Management

An Erosion and Sediment Control Plan will be prepared in accordance with the requirements of the Council and Landcom "Managing Urban Stormwater; Soils and Construction" manual 2004 prior to any works commencing at the site (associated with the

Water Recycling Facility) and will be maintained for the duration of the approval to prevent any sediment and dirty water entering any waterway. It would contain emergency procedures for high rainfall events that could increase soil erosion during construction.

The Erosion and Sediment Control Plan is likely to include the following mitigation measures at a minimum:

- Installation of erosion and sedimentation control devices prior to excavation of the site. Erosion controls would remain in place until the bare soils and surfaces are stabilised (by revegetation or other means) and removed when redundant. This should include the diversion of clean water around the site in order to avoid treating it and also to avoid potential additional erosion from off site sources.
- Appropriate erosion and sediment control devices would be placed downslope of all excavation works, spoil stockpiles or works that would disturb the ground surface, downslope of access roads that are highly utilised and in other areas as appropriate.
- The area to be disturbed by construction activities would be minimised as far as possible.
- Daily visual inspections of erosion and sediment control devices to determine the condition and effectiveness of control measures. Immediate action would be taken to fix any control devices that have failed to work adequately.
- Disturbed areas would be restored to original condition upon completion of the works in that area.
- Earthworks would be avoided or minimised during wet weather, in order to minimise water-induced soil erosion and increased sedimentation to the surrounding environment.
- It is recommended that the construction access tracks be formed using a stabalised aggregate or crusher dust material that would be able to withstand significant flows during flood events without being susceptible to erosion and sedimentation of the flood water. This would assist with minimising potential water quality impacts on the surrounding environment.

7.2.4 Flora and Fauna

A copy of the ecological assessment conducted for the immediately adjacent Sewer Pump Station T site and rising main (included in the Review of Environmental Factors approved by Council for the construction of this adjoining pump station) is attached in *Appendix D*. It is considered that this ecological assessment would be relevant to this subdivision proposal as it is for sewer infrastructure, immediately adjacent to the existing pump station site and is within the same vegetation community. It is expected that once location details of the Water Recycling Facility structures are more definite, the secondary development application (ie for the facility itself) will provide a detailed and more specific ecological impact analysis.

However, the potential impact of the proposed Water Recycling Facility on flora and fauna within the site is expected to be negligible. Below are some likely mitigation measures which could be implemented during construction:

 The minimum practicable clearing of SGTF and trees would be conducted for construction purposes and threatened species would be avoided where feasible. Trenches in the vicinity of retained trees would be by hand excavation or bored and are to proceed only with approval of the site arborist. Hand excavation and boring would also be used to avoid removal of threatened plants. Any pruning of retained trees would be undertaken by the site arborist.

- The choice of equipment used in the installation of the Water Recycling Facility would ensure that the minimum amount of disturbance would be required for access and earthworks in areas containing native vegetation.
- Earthwork equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from work areas to minimise the likelihood of the spread of weed seeds and plant pathogens.
- Suitable control measures would be implemented to prevent erosion and sediment deposition as per the Construction Environmental Management Plan.
- Temporary fencing would be placed between areas containing threatened plant species and SGTF to be retained to exclude earthworks. Fencing would be placed outside the drip-line of trees where possible.
- Regeneration and revegetation is disturbed areas on and adjacent to the construction areas would be conducted using local provenance plant species indigenous to the STGF EEC.
- Bushland regeneration would be conducted by a suitably qualified and experienced contractor after the end of construction works in all areas of retained vegetation and revegetated areas. Weeds, especially Kikuyu Grass and noxious weeds, must be adequately controlled prior to revegetation and maintained at a low (less than 90% of current) density during this period.
- The trees requiring removal for the construction of the Water Recycling Facility would be cut into manageable lengths for use in habitat augmentation within the adjacent SGTF remnant.
- All other native vegetation cleared would be mulched and stockpiled on site for later use in soil stabilisation and vegetation rehabilitation. Mulch would be stockpiled in disturbed vegetation adjacent to the existing Sewer Pump Station T site so as to minimise disturbance to native vegetation and the spread of weeds. Advice would be sought from an ecologist to determine suitable locations for stockpiles.
- An ecologist or suitably experienced and licensed bushland regenerator would be present for all tree-felling to collect seeds for use in revegetation.
- Retained trees would be monitored during vegetation rehabilitation and any signs of poor health reported to Hawkesbury Council and the site arborist to determine an appropriate course of action.
- An ecologist would be present during the removal of any large woody debris in order to
 relocate any native fauna using this habitat to retained strands of SGTF. If any
 additional threatened species are discovered, works would immediately cease. Advice
 would be sought from Hawkesbury Council ecologist and appropriate measures would
 be implemented to protect or relocate individuals of these species prior to the
 resumption of works. The discovery would also be reported to DECCW.
- Fallen logs would be relocated from the earthworks areas to adjacent patches of SGTF under the supervision of an ecologist.

7.3 Section 79C(1)(b) – Built Environment Impacts

7.3.1 Visual impacts and Streetscape

The subdivision will have insignificant impact on views and vistas in this locality as the subdivision does not propose any structures. The subdivision tidies up the corner of Bootles Lane and Johnston Street in terms of it "filling the gap" between Bootles Lane and the southern side of the existing Sewer Pump Station T site.

In relation to the Water Recycling Facility, supplementary planting will be proposed, including screen plantings to reduce visual effect. The Water Recycling Facility building is to be designed and built to replicate a dwelling house with large setbacks to Bootles Lane and Johnston Street and the use of non-reflective building materials – again to assist in reducing visual effect. The Water Recycling Facility structure and associated landscaping will help reduce the visual impact of the existing Sewer Pump Station T site as well.

Note that no dwelling entitlement will be given to the subject land.

7.3.2 Heritage

A Section 90 permit under the National Parks and Wildlife Act has previously been granted by DECCW in relation to the entire Bona Vista Precinct (including the subject land).

In relation to non-indigenous heritage, the fence line fronting Johnston Street is nominated within a conservation area. It is considered unlikely that the subdivision of this land will have significant adverse impacts on this old fence alignment that would warrant a refusal of the application.

In relation to the secondary application for the Water Recycling Facility, it is noted that should any sites or items of heritage significance be encountered during construction, works in that area will be stopped until appropriate consultation and approvals have been obtained.

7.3.3 Traffic

During the construction period, the majority of traffic movements to and from the site would comprise truck movements delivering construction materials and removing waste and private vehicle trips made by construction workers.

During the longer term, there would be intermittent truck movements to and from the Water Recycling Facility for maintenance and operational inspections. Details of such movements will be documented in the secondary application for the Water Recycling Facility.

7.4 Section 79C(1)(b) – Social and Economic Impacts

To provide reticulated sewerage services to the Vermont Pitt Town release area, Council (in consultation with Johnson Property Group) adopted a sewerage strategy in October 2008. This included the installation of a new pump station (Pump Station T) off Bootles Lane / Johnston Street and associated rising main.

The cost to provide the entire sewer infrastructure to satisfy Council (being the sewer service authority) was estimated at \$21.35 million. This cost is inequitable and prohibitive for the development of the Vermont Pitt Town release area and an alternative solution was sought by Johnson Property Group.

Recent legislative changes to the Water Industry Competition Act 2006 (WICA) were made in August 2008. In brief this legislation enables private entities to become a Water Authority with all the powers of any current Water/Sewer Authority. The legislation falls under the responsibility of the Minister for Water and is regulated through the Independent Pricing and Regulatory Tribunal (IPART). IPART has strict guidelines as to who can be granted a licence under the WICA legislation. However, once a licence is granted, residents who choose to connect to the private sewerage scheme will fall outside of Council's authority for sewer services.

In consultation with Council officers, Johnson Property Group developed a proposal to construct an independent Water Recycling Facility for Vermont Pitt Town under the guidelines of the WICA legislation. The Water Recycling Facility proposal treats sewage locally and produces high quality recycled water for non-potable uses within the community. This local treatment and non-potable reticulation reduces infrastructure costs and improves the viability of Vermont Pitt Town.

Whilst Council plays no part in the determination of granting a WICA licence, Council has resolved in-principle support of this alternative scheme by way of resolution on 25 August 2009.

7.5 Section 79C(1)(c) – Suitability of the Site for Development

This SoEE documents further investigations into environmental issues and constraints such as flooding, heritage, ecology, landscaping and visual impact and have established that having regard to these issues, the site is suitable for its intended use – being a Water Recycling Facility.

It is suggested that in order to service the Vermont Pitt Town Release Area in the manner proposed (ie via the WICA legislation) a subdivision and SEPP 1 approval is a necessary step to achieving that outcome.

Additional physical attributes of the site have been investigated further to establish site suitability which is addressed below.

7.5.1 Contamination and Acid Sulphate Soils

A geotechnical investigation has been carried out by Golder Associates and a report issued; *Geotechnical Investigation Proposed Residential Development Pitt Town, NSW* dated June 2005 (see **Appendix C**). The report discusses the geotechnical investigation and based on the information available, it can be deduced that:

- o Ground condition is relatively consistent across the study site;
- o Soils generally comprise of sand and clay mixtures;
- o Bedrock was not encountered with the depth of investigation;
- In the eastern half of the site the profile is predominately clay with a variable layer of silt and sand;
- o Seepage was encountered to a depth of 0.7m to 2m in several of the test pits;
- o The site of the proposed works would not be located in an area subject to landslip.

Contamination investigations indicated there would be a low risk of buried materials (such as underground tanks or potential fill).

There are no known acid sulphate soils on the site.

7.5.2 Groundwater

There is limited information on groundwater in the Pitt Town area. The Pitt Town LES indicated that the salinity of the groundwater was likely to be elevated and there were localised areas of higher water table. The LES reported on a study on the Fernadell and Bona Vista properties by Golder Associates that identified ground water to be from 0.2m below the surface in drainage lines to about 1m below the surface for the majority of the two properties. The geotechnical study undertaken for the adjoining Pump Station T site encountered seepage to a depth of 0.7m - 2m in several of the test pits.

As was the case with the adjoining Sewer Pump Station T site, groundwater is not considered to be a constraint to subdividing the land or developing it for the purpose of a Water Recycling Facility.

7.5.3 Essential Services and Infrastructure

As a result of the site's proximity to the adjoining Sewer Pump Station T site, the water and electrical services provided to operate this existing Pump Station site are also available at the boundary of the proposed Water Recycling Facility site.

7.6 Section 79C(1)(d) – Submissions

The proposed subdivision development is required to be publicly notified for 14 days (unless Council determines otherwise) in accordance with the Hawkesbury Development Control Plan 2000. Pursuant to section 79(1)(c) of the EP&A Act, Council will be required to give due consideration to any submissions made during that notification period.

It is expected that, following public notification, any submissions made for or against the proposal will be referred back to the applicant for consideration and comment.

7.7 Section 79C(1)(e) – Public Interest

Recent legislative changes to the Water Industry Competition Act 2006 (WICA) were made in August 2008. In brief this legislation enables private entities to become a Water Authority with all the powers of any current Water/Sewer Authority. The legislation falls under the responsibility of the Minister for Water and is regulated through the Independent Pricing and Regulatory Tribunal (IPART). IPART has strict guidelines as to who can be granted a licence under the WICA legislation. However, once a licence is granted, residents who choose to connect to the private sewerage scheme will fall outside of Council's authority for sewer services.

The subdivision of the land paves the way for a Water Recycling Facility to be installed and operated by a licensed authority under WICA 2006 legislation. This ensures that a more affordable alternative to the October 2008 Council sewerage strategy can be realised as the local treatment and non-potable reticulation reduces infrastructure costs and improves the viability of Vermont Pitt Town.

In addition, the subdivision enables an environmentally responsible solution to servicing Vermont Pitt Town via the reuse of treated non-potable water.

The proposed subdivision is isolated adjoining an existing Sewer Pump Station and will be designed to replicate the appearance of a dwelling structure, even through it will not be used for dwelling purposes. The facility will be screened with landscaping and hence, will not be obtrusive or out of character in this location.

The subdivision proposal to enable the installation of the Water Recycling Facility is in the public interest.

8 Conclusion

The proposed subdivision has been assessed against the relevant legislation and planning policies that apply to the site. The proposal has been found to substantially comply with the provisions of the relevant SEPPs. The proposal has also been assessed against the provisions of the Hawkesbury LEP 1989 and the draft Hawkesbury LEP 2009. Whilst the subdivision of the land does not meet the minimum lot size criteria (10ha) within its Environmental Protection – Agriculture Protection zone, the subdivision of the land for the sole purpose of a Water Recycling Facility (by a company to be licensed under the Water Industry Competition Act 2006) does not detract from the intent of the objectives of this zone, does not provide a dwelling entitlement, and is for a public purpose and therefore subdivision consent could be granted. It is considered that strict compliance with this lot size development standard is unreasonable and unnecessary in this particular case.

The Hawkesbury DCP 2000 has also been considered as part of this SoEE and found that the subdivision proposal was highly consistent with this DCP.

As outlined in Section 7 of this SoEE, the subdivision proposal is not expected to result in any significant adverse impacts. Where potential impacts have been identified, it is understood that appropriate mechanisms can be established to reduce these impacts. It is expected that further detail, specific to the construction of the Water Recycling Facility, regarding any impacts associated with the Water Recycling Facility itself, will be provided in a secondary development application.

This subdivision enables the Water Recycling Facility to be established consistent with the resolution of Council dated 25 August 2009 regarding the establishment of a separate authority to service the sewer needs of the Vermont Pitt Town Release Area. Water Industry Competition Act 2006 legislation enables this to occur.

Having regard to Section 79C of the Environmental Planing and Assessment Act, the subdivision proposal is considered to satisfactorily respond to the opportunities and constraints of the site and the relevant legislation, is unlikely to result in adverse impacts in the locality and is therefore worthy of Council approval and Department of Planning SEPP 1 concurrence.

F13 APPENDIX A:

DRAFT PLAN OF SUB-DIVISION AND SITE CONTOUR PLAN





F13 APPENDIX B:

WICA LEGISLATION FACT SHEET



WICA FACT SHEET

Overview of licensing regime under the *Water Industry Competition Act 2006*

August 2008

Introduction

The NSW Government introduced the *Water Industry Competition Act* 2006 (the Act) http://www.ipart.nsw.gov.au/water/privatesector-licensing/regulatory-framework.asp as part of its strategy for a sustainable water future to harness the innovation and investment potential of the private sector in the water and wastewater industries. At the same time, the Act establishes a licensing regime for private sector entrants to ensure the continued protection of public health, consumers and the environment.

A person must not construct, maintain or operate any water industry infrastructure or to supply water (potable or non-potable) or provide sewerage services by means of any water industry infrastructure otherwise than under the authority of a licence under the Act. An application for a licence may only be made by or on behalf of a corporation.

However, a public water utility does not require a licence in relation to water industry infrastructure situated within its area of operations. (Note: There are other exemptions to the requirement for a licence. See Fact Sheet "Who needs a licence under the WIC Act?" for more information at http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.)

Legislative framework

The Act sets out when a licence is required, the procedures for applying for a licence, how licences and licence fees are determined, and how licences are audited and enforced. The Act establishes mechanisms to resolve disputes between private sector bodies and their customers, and to protect customers in the event of the failure of a new market entrant (i.e. retailer of last resort provisions). The Act also establishes a register of licences to provide key licensing information to licensees and the public.

The Act sets out the functions and responsibilities given to the Minister for Water (the Minister) and the Independent Pricing and Regulatory Tribunal (IPART) in relation to the licensing regime. The Minister's functions include determining whether to grant a licence, determining licence conditions, setting licence fees and enforcing licences. IPART's functions include considering licence applications, recommending the terms or conditions of a licence to the Minister, and auditing and enforcing licences. The Minister also has a range of functions to ensure the integrity of the licensing regime, such as giving emergency directions to deal with a risk to public health or safety, declaring specified persons as retailers of last resort and declaring a supply failure.

The Act is supported by the *Water Industry Competition (General) Regulation 2008* (the Regulation)

http://www.ipart.nsw.gov.au/water/privatesector-licensing/regulatory-framework.asp which sets out the matters a licence application must address, standard licence conditions, information to be contained on the register of licences and the retailer of last resort provisions. The Regulation also provides for the establishment of a marketing code of conduct, a transfer code of conduct and a water industry code of conduct.

The following information provides an overview of the elements of the licensing regime set out under the Act and the Regulation.

Types of licences granted

Corporations that wish to supply water or provide sewerage services must obtain a licence.

There are two types of licences:

- a network operator's licence, and
- ▼ a retail supplier's licence.

Network operator's licence

A network operator's licence must be obtained to construct, maintain or operate water industry infrastructure. Once the Minister has granted a network operator's licence, the licensee is entitled to operate on terms similar to a public water utility. Specifically, licensed network operators are entitled to:

- carry out work in or under public roads and public reserves to construct water industry infrastructure
- require landowners to stop trees, other structures and things on their land from damaging their infrastructure
- retain ownership of all the water industry infrastructure they construct, whether or not they own the land in, on or over which it is situated

 appoint meter readers to enter private premises to read meters that measure the supply of water from or discharge of sewage into a water or sewer main controlled by the licensed network operator.

A licensed network operator does not need to pay the local council or roads authority for any water industry infrastructure located in a public reserve or public road or for the space in a public reserve or public road that is occupied by the infrastructure.

Retail supplier's licence

A retail supplier's licence must be obtained to supply water (potable or non-potable) or provide sewerage services by means of water industry infrastructure. A retail supplier may require access to existing infrastructure to supply water or provide a sewerage service via the use of that infrastructure. (For further information, see http://www.ipart.nsw.gov.au/water/networkaccess/network-access.asp.)

Licensed retail suppliers will be required to belong to an approved external ombudsman scheme to deal with disputes and complaints involving small retail customers.

Licensed retail suppliers are also required to implement any relevant government policy with respect to social programs that apply to it. Social programs for the supply of water and the provision of sewerage services are programs to ensure that those services are available to people in need, including those suffering financial hardship and those living in remote areas, and includes a program for the granting of payment assistance, discounts or rebates.

Licensed retail suppliers must comply with the water industry code of conduct, marketing code of conduct and transfer code of conduct established pursuant to the Regulation.

Applying for a licence

Licence applications must be lodged with IPART. (Licence application forms can be obtained from http://www.ipart.nsw.gov.au/water/privatesector-licensing/application-forms.asp). IPART will furnish copies of the application to the Minister. IPART will also furnish copies and invite submissions from:

- ▼ the Minister administering the *Public Health Act* 1991,
- the Minister administering Chapter 2 of the Water Management Act 2000,
- the Minister administering the Environmental Planning and Assessment Act 1979, and
- the Minister administering the Protection of the Environment Operations Act 1997.

IPART must also invite submissions on the application from the public.

IPART will consider the licence application, along with any submissions, and provide a report to the Minister recommending whether or not the licence should be granted and on what terms or conditions.

Obtaining a licence

Licences are granted by the Minister. In deciding whether or not to grant a licence, and what conditions the licence should be subject to, the Minister will consider (but is not bound to accept) any advice or recommendation in IPART's report.

To obtain a licence, applicants must:

- be a corporation
- not be a disqualified corporation
- have, and continue to have, the capacity (including technical, financial and organisation capacity) to carry out the activities to be authorised by the licence
- have the capacity to carry out the activities to be authorised by the licence in a manner that does not present a risk to public health or a significant risk of harm to the environment

- have made, and continue to maintain, appropriate arrangements with respect to insurance
- comply with such other matters as the Minister considers relevant, having regard to the public interest.

In addition, applicants for a retail supplier's licence to supply water must, if the licence is granted, be in a position to obtain sufficient quantities of water from a source other than from a public water utility.

In determining whether or not to grant a licence, and what conditions the licence should be subject to, the Minister will have regard to a number of licensing principles under the Act:

- protection of public health, the environment, public safety and consumers
- encouragement of competition
- sustainability of water resources
- promotion of production and use of recycled water.

Licence conditions

If an application is successful, a licence will be granted indefinitely, dependent upon the payment of annual licence fees and compliance with the licence. The licence will be subject to conditions imposed by the Act, the Regulation and the Minister.

Standard licence conditions that apply to all licences are set out in the Schedules to the Regulation. These standard licence conditions include requiring a licensed network operator to prepare and implement an infrastructure operating plan and water quality or sewage management plan (as is relevant), and a licensed retail operator to prepare and implement a retail supply management plan.

The Minister may impose such additional licence conditions as he or she see fits, consistent with the Act and the Regulation. In particular, the Minister may impose conditions to:

- ensure the licensee has, and continues to have, the capacity (including technical, financial and organisational capacity) to carry out the activities authorised by the licence,
- give and maintain security (in such amount and form as the Minister may determine) for the fulfilment of the licensee's obligations under the licence, and
- maintain appropriate arrangements with respect to insurance.

IPART will make recommendations to the Minister as to what licence conditions it believes the licence should be subject to.

The conditions of a licence may be varied at any time either by the Minister or upon application by the licensee. The existing conditions may be amended or new conditions may be imposed.

Commercial operation of new infrastructure

The granting of a licence does not allow the licensee to bring new water or sewerage infrastructure into immediate commercial operation. It is a standard licence condition on all network operators' licences that written Ministerial approval must be obtained prior to commencing commercial operation.

See Fact Sheet "Commercial operation of new infrastructure under the WIC Act" for further information at

http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.

Performance monitoring and reporting

The licensee must keep records and furnish information to IPART, where IPART requests the licensee to do so. IPART is required to report to the Minister annually on the compliance of licensees with their licence conditions. This report is to be laid before both Houses of Parliament.

Licence audits

A number of components of the licensing regime are subject to audit.

Compliance and licence review audits:

IPART is required to monitor and report to the Minister on a licensee's compliance with the conditions of the licence. In particular, IPART is required to review each licence at intervals of not more than every 5 years (starting from the date the licence commences). IPART may require an audit of the licence as part of its compliance reporting or licence review process.

Commercial operation of new infrastructure audits:

An audit must be conducted by an approved auditor and provided to the Minister in order to obtain his or her approval to bring any new water or sewerage infrastructure into commercial operation.

Plans and infrastructure audits:

Periodic audits by an approved auditor will also be required by the Minister or IPART as to the condition of the licensee's infrastructure and the adequacy of the licensee's infrastructure operating, water quality, sewage management or retail supply management plans (as is relevant to the particular licence).

See Fact Sheet "Summary of audit framework under the WIC Act" for further information at http://www.ipart.nsw.gov.au/water/privatesector-licensing/fact-sheets.asp.

Approved auditors

An approved auditor will conduct audits on behalf of the Minister, IPART or a licensee. An approved auditor is a person nominated by IPART, chosen by the licensee from a panel of persons nominated by IPART or nominated by the licensee and approved by IPART.
See Fact Sheet "Joining the audit panel for the purposes of the WIC Act" for further information at http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.

Licence enforcement

When a licensee contravenes the Act or the Regulation or a condition of the licence, the Minister or IPART may take a range of enforcement action. Such action could include (amongst other things) imposing a monetary penalty not exceeding \$500,000 for the first day of the contravention, and \$20,000 for each subsequent day (not exceeding 25 days); requiring a licensee to notify customers or take action to rectify the contravention; cancelling or suspending a licence; or disqualifying a corporation or individual for the purposes of the Act. (However, some of these enforcement actions can only be taken by IPART if the Minister concurs.)

Register of licences

IPART must maintain a register of licences on its website which will contain all the key information pertaining to each licence granted under the Act. The register can be found at

http://www.ipart.nsw.gov.au/water/private-sector-licensing/registers.asp.

Monopoly suppliers

A licensed network operator or a licensed retail supplier may be declared by the Minister to be a monopoly supplier if they provide a service for which there are no other suppliers to provide competition in that market, and for which there is no contestable market by potential suppliers in the short term and, in the case of a water supply service for recycled water, that connection of land to that service is required by or under some other Act.

If declared a monopoly supplier, the licensee may be subject to a pricing determination or periodic review of their pricing policies by IPART.

Retailer of last resort scheme

Where a licensed retail supplier can no longer supply water or provide sewerage services to its customers, the Act protects the continued supply of these customers by providing that a licensed retail supplier or a public water utility may be declared by the Minister as a retailer of last resort. In the event that the Minister declares a supply failure in relation to a licensed retail supplier, the retailer of last resort must commence supplying water or providing sewerage services to the customers in the area in respect of which it is the retailer of last resort.

Further information

For any further information on the licensing scheme, please contact IPART's Utility Licensing team either by:

- **phone** (02) 9290 8400 (general number)
- email compliance@ipart.nsw.gov.au

Legal context for this Fact Sheet

IPART has prepared this Fact Sheet as a general summary of relevant parts of:

the Act

Water Industry Competition Act 2006.

the Regulation

Water Industry Competition (General) Regulation 2008.

This Fact Sheet should not be relied on as a substitute for legal advice, and is designed to be read in conjunction with the above source documents.

F13 APPENDIX C:

GEO-TECHNICAL INVESTIGATION REPORT

Golder Associates Pty Ltd A.B.N. 64 006 107 857

88 Chandos Street 88 Chandos Street St Leonards, NSW 2065, Australia (PO Box 1302, Crows Nest, 1585) Telephone (02) 9478 3900 Fax (02) 9478 3901 http://www.golder.com



FACTUAL REPORT ON

GEOTECHNICAL INVESTIGATION PROPOSED PUMPING STATION PITT TOWN, NSW

Submitted to:

Johnson Property Group Pty Ltd Suite 3205, Level 32, Chifley Tower 2 Chifley Square Sydney NSW 2000

DISTRIBUTION:

- 1 Сору Johnson Property Group Pty Ltd. ... 2 Copies
 - Golder Associates Pty Ltd ...



August 2007

05623002/020



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Greg Moore	- i -	21 August 2007
Johnson Property Group		05623002/020

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Golder Associates

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Greg Moore	- 1 -	21 August 2007
Johnson Property Group		05623002/020

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Golder Associates Pty Ltd (Golder) at the site of a pumping station and collection structure to be constructed for the proposed residential development at the Bona Vista and Fernadell land parcels in Pitt Town, NSW (the 'Site'). The current investigation forms a part of ongoing environmental and geotechnical works carried out since 2005 by Golder on behalf of Johnson Property Group (Golder Associates Report ref. 05623002). The Site location and proposed pumping station and collection structure are shown in Figures 1 and 2.

The area of the proposed pumping station and collection structure is about 80 m by 40 m and is located off of Bootles lane, in the south-eastern corner of the 40 hectare Bona Vista land parcel. The Site was previously used for agricultural purposes. The Bona Vista property is located within the jurisdiction of Hawkesbury Council, County of Cumberland and Parish of Pitt Town and is currently zoned as rural land. It is proposed to subdivide the land for development with primarily low-density residential and rural housing, in accordance with draft amendment No. 45 of the Hawkesbury Local Environmental Plan (1989).

The geotechnical investigation was performed in accordance with our proposal (P77622099.A 31st May 2007). The investigation was carried out following approval to proceed from Mr Paul Hedge of Johnson Property Group Pty Ltd (JPG) dated 18th February 2005. This report contains the factual field and laboratory data obtained from the geotechnical investigation.

Our brief was to carry out the geotechnical investigation and provide the field and laboratory test results. Our scope did not include providing geotechnical interpretation or recommendations.

2.0 SCOPE OF WORK

2.1 Fieldwork

The scope of fieldwork for the geotechnical investigation included the drilling of 2 boreholes, BH1 and BH2, using a truck mounted drill rig to depths of 15 m and 12 m, respectively. Boreholes were advanced using solid flight augers fitted with a 'TC'-bit, with Standard penetrometer (SPT) tests performed at 1.5 m intervals. Groundwater inflow observations were made throughout drilling in both boreholes, and water level measurements taken one week following the investigation.

Boreholes were drilled at locations nominated in the Drawing 60023107-GE-004 provided by Maunsell/Aecom, as shown in Figure 2. Borehole locations and levels were surveyed and marked out by a registered surveyor of Rose Atkins Conics Pty Ltd, as a subcontractor to Johnson Property Group, prior to commencement of drilling. Borehole BH1 was located at the position of the proposed wet well, and borehole BH2 at the location of the proposed collection manhole.

The fieldwork was carried out in the presence of a Geotechnical Engineer from our Sydney Office who described the subsurface conditions and collected soil samples. The borehole reports and explanatory notes are presented in Appendix A. The fieldwork was carried out on the 9^{th} August 2007 in accordance with Golder Standard Quality Procedures.

2.2 Geotechnical Laboratory Testing

Five soil samples selected from the two boreholes were submitted to Envirolab Pty Ltd and Golder Associates Laboratory in Adelaide for laboratory analysis. Both laboratories are NATA registered for the tests performed, which included:

- 2 samples for Moisture Content AS 1289 2.1.1;
- 2 samples for Liquid Limit Casagranide methods AS1289.3.1.1 & AS1289.3.1.2;
- 2 samples for Plastic Limit AS1289.3.2.1;
- 2 samples for Plasticity Index AS1289.3.3.1;
- 1 sample for Particle Size Distribution AS 1289.3.6.1 and
- 2 samples for aggressivity Suite including pH, Electrical Conductivity, Soluble Sulphate and chloride.

Laboratory test certificates are presented in Appendix B.

3.0 SITE INFORMATION

3.1 Site Observations

The location of the proposed pumping station and collection structure is an undeveloped wooded area of the Bona Vista land parcel, bordering on an existing residential property to the east. Tall grass and organic debris including large tree branches cover the ground here, which is slightly undulating with no definitive slope direction. Access to the site was through a barbed wire fence bordering on Boodles Lane. The prevailing weather conditions at the time of the investigation were sunny and dry, though it had rained heavily in the previous months.

3.2 Geology and Hydrogeology

The Penrith Sheet 9031 of the 1:100,000 geological maps (SCS NSW, 1991) indicates that the Site is in an area underlain by the Quaternary Pitt Town Sand Formation comprising quartz sand, clay and minor pebbles. Ashfield Shale of the Wianamatta Group is shown on the geological map close to the western boundary of the Site and comprises claystone-siltstone and fine sandstone-siltstone laminates.

The Penrith 1:100,000 Series Soil Landscapes Sheet 9030 (SCS NSW, 1989) indicates that the Site is primarily on the Agnes Bank soil landscape comprising low parallel alluvial / aeolian sand dunes on a flat terrace surface of Tertiary age.







4.0 RESULTS OF THE INVESTIGATION

4.1 Subsurface Conditions

The boreholes indicate that ground conditions in the area of the proposed pumping station are relatively consistent. The soils generally comprise clay with some rootlets and ironstone gravel over gravelly sand with trace of clay (gravelly sand present in BH1 only). Bedrock was not encountered within the depth of investigation (up to 15 m depth).

Borehole	Depth (m, bgl)	Description		
BHI	0.0 - 5.50	ALLUVIAL SOIL – Silty CLAY, medium to high plasticity, very stiff to hard		
	5.50 - 12.45	ALLUVIAL SOIL – Silty CLAY, high plasticity, stiff to hard		
	12.45 - 12.80	ALLUVIAL SOIL – Band of IRONSTONE gravel		
	12.80 - 15.00	ALLUVIAL SOIL – Gravelly SAND, medium to coarse grained, trace of clay, medium dense		
	0.0-3.00	ALLUVIAL SOIL - Silty CLAY, high plasticity, soft to very stiff		
BH2	3.00 - 10.60	ALLUVIAL SOIL - Silty CLAY, high plasticity, very stiff		
	10.60 - 12.00	ALLUVIAL SOIL – Silty CLAY, medium to high plasticity, very stiff.		

4.2 Geotechnical Laboratory Test Results

Three samples were selected for geotechnical laboratory analysis. The results of the Atterberg limit testing are presented as follows:

Table 2 : Summary of Geotechnical 1	Laboratory	Results
-------------------------------------	------------	---------

Test Location	Depth (m)	Soil Type	Field Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	Particle Size Distribu tion
BH1	1.50- 1.95m	Clay	17.4	52	17	35	N/A-
BH2	3.00 - 3.45m	Clay	14.7	36	13	23	N/A-

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A grain size analysis was also performed on a sample taken from borehole BH1 at a depth of 3 m. The grain size curve indicates a clay soil, and is presented in Appendix B.

Increasing concentrations of sulphates, chlorides, electrical conductivity or low pH create a more aggressive environment for concrete and steel. The results of the aggressivity testing are presented as follows:

Test Location	Depth (m)	Soil Type	pH (pH Units)	Electrical Conductivity (μ S/cm)	Soluble Sulphate (mg/kg)	Chloride (mg/kg)
BHI	4.50- 4.95m	Clay	4.6	960	170	1,200
BH2	0.50- 0.95m	Clay	4.8	640	520	310

Table 3 : Summary of Aggressivity Laboratory Results

The outcome of the pH, chloride and sulphate analyses have been compared with the guidelines for durability presented in Tables 6.1 and 6.3 of AS 2159 *Piling – Design and Installation.* The results indicate that the soil at the Site is likely non-aggressive to mildly aggressive to buried steel and concrete elements.

Laboratory certificates are presented in Appendix B.

4.3 Groundwater Conditions

During the drilling investigation, groundwater inflow was observed at an R.L of 7.85 m AHD in BH1 and at an R.L of 7.68 m AHD in BH2. The water level in BH1 was then taken three hours after drilling to allow for recharge, and it was observed to have risen several metres to an R.L of 10.68 m AHD.

Measurement recorded a week following the investigation indicated groundwater at an R.L of 12.05 m in BHJ and an R.L of 11.88 m in BH2. These readings are inferred to be representative of the equilibrium level in the area, which may fluctuate seasonally and following infiltration events.

5.0 IMPORTANT INFORMATION

Your attention is drawn to the document - "Important Information About Your Geotechnical Engineering Report", which is included in Appendix ? of this report. This document has been prepared by the ASFE (*Professional Firms Practicing in the Geosciences*), of which Golder Associates is a member. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

GOLDER ASSOCIATES PTY LTD

1 cTheen

Jessica McIlveen Geotechnical Engineer

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RMP:JKM/PD: GJF/mp

Phil Davies Senior Geotechnical Engineer



- C.



Appendix A Borehole Reports and Explanatory Notes

	LIEN ROJI DCA DB N	T; ECT FION O;	: 1:	Johns Propo Pitt To 05623	on Property Group sed Pumping Stat wn 002	p ilon		POSITION: Location of Wet Well COORDS: 302101.1 m E 6282382.6 m N 56 M SURFACE RL: 16.25 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 15.50 m	3A94	DRILL DRILL DRILL LOGG CHEC	RIG: Hydrapower Scout ER: Macquarie Drilling ED: JKM/RMP DATE: 9/ KED: PD DATE: 2/	
	7	Dril	ling		Sampling		Field Material Description					
METHOD	PENETRATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-	16.20	DS0.00-0.20 m SPT0.50-0.95 m 2,6,10 N = 16		СН	TOPSOIL: Sandy SILT, low plasticity, dark brown CLAY, high plasticity, mottled orange and grey, with some slit lenses and a trace of fine angular gravel, roots	W	AL	LUVIAL SOIL	
			1.0-	0.87	SPT1.50-1.95 m 7,9,17 N = 26	× ×	CI	Silty CLAY, medium to high plasticity, light grey with orange mottling		St-VSt		
	<u>.</u>		2.0-	2,50 13.75				As above but with bands of ironstone gravel, red, medium grained, with a trace of fine gravel and sand	-	NSI		
		2	3.0-		SPT3.00-3.45 m 9,14,18 N = 32				W-Q			
ADT	L	16/8/07 IX	4.0-		SPT4,50-4.95 m 7,13,20 N = 33					T		
			5.5- 6.0- 6.5-	5.50 10.75	SPT6.00-6.45 m 10,14,17 N = 31		CH	CLAY, high plasticity, pale grey with some orange mottling with ~50% zones of Sitty CLAY, medium to high plasticity, red and orange, dry, hard (weathered ironstone)				
			7.0-	7.50 8.75	SP17.50-7.95 m 10,15,23 N = 38			Silty CLAY, high plasticity, grey, trace of orange staining	W	H-ISN		



REPORT OF BOREHOLE: BH1

CLIENT: PROJECT: LOCATION: JOB NO: 05623002

Johnson Property Group Proposed Pumping Station Pitt Town

POSITION: Location of Wet Well COORDS: 302101.1 m E 6282382.6 m N 56 MGA94 DRILL RIG: Hydrapower Scout V SURFACE RL: 16.25 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 15.50 m

SHEET: 2 OF 2

DRILLER: Macquarie Drilling LOGGED: JKM/RMP DATE: 9/8/07 CHECKED: PD DATE: 21/8/07

	Drilling Sampling							Field Material Desc				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
		rilling	8.0	8.40 7.85			×		Silty CLAY, high plasticity, grey, trace of orange staining with zones of fine to medium ironstone gravel ~15%	M	VSt-H	ALLUVIAL SOIL
	L	Seepage observed during d	9.0		SPT9.00-9.45 m 12,13,14 N ≈ 27					M		
	M		10.0	10.80 5.45	SPT10.50-10.95 m 5,7,14 N = 21			CL	Silly CLAY, medium plasticity, with ~50% Silty CLAY, low plasticity, red-brown (extremely weathered ironstone)		St-VSt	
ADT			11.5 - - 12.0 - - - - - - - - - - - - - - - - - - -	12.00 4.25 12.50	SPT12.00-12.45 m 5,10,14 N = 24			CR	with zones of fine to medium ironstone gravel ~15%	W-C		- - - - - - - - - - - - - - - - - - -
	н		-	12.80				GF	Band of itonstone GRAVEL, the to medium grained		Т	-
	м			3,45	SPT13.50-13.95 m 9,11,13 N = 24		0 	SC	Gravelly Clayey SAND, medium to coarse grained, mottled red-orange and brown with a trace of black, clay is medium plasticity, gravel is fine, sub-angular to sub-rounded, clay lenses		VSt	
	н		14.5	2.25	SPT15.00-15.45 m 12 17 30 N = 47		0 0 -0 -0		gravel content increasing	Ψ		
			- - - - - - - - - - - - - - - - - - -	<u>15.50</u> 0,75	.2,11,30 14 - 47		. <u>.</u> D.		END OF BOREHOLE @ 15.50 m Reached target depth Boreholes left open for water level monitoring			
				Thi geot	is report of borehole echnical purposes or for information only	mu ily, and	st be r withou d do no	ead ut atto ot ne	n conjunction with accompanying notes and abbreviation ampt to assess possible contamination. Any references cessarily indicate the presence or absence of soil or grou	s. It o pol indwa	has t tentia ater c	been prepared for I contamination are ontamination. GAP gINT FN. F01a RL2

CLIENT: Johnson Property Group PROJECT: Proposed Pumping Station LOCATION: Pitt Town JOB NO: 05623002					on Property Grou sed Pumping Stat own 0002	p tion		POSITION: Location of ManholeSHEET: 1 OF 2COORDS: 302113.9 m E 6282381.7 m N 56 MGA94 DRILL RIG: Hydrapower Scout VSURFACE RL: 16.18 m DATUM: AHDINCLINATION: -90°LOGGED: JKM/RMP DATE: 9/8/07HOLE DIA: 100 mmHOLE DEPTH: 12.45 mCHECKED: PDDATE: 21/8/07							
		Dri	lling		Sampling			Field Material Description							
METHOD	PENETRATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
			0.0	16,13	D\$0.00- m		×	сн	TOPSOIL: Sandy SILT, low plasticity, dark brown Silty CLAY, blob plasticity, red, grey and brown, with a	1	-	ALLUVIAL SOIL			
			0.5	0.50 15.68	SPT0,50-0.95 m 3,6,10 N = 16	1	×		trace of grey slit, rootlets and organic matter (to 0.5m) some rootlets and roots, no organic matter from 0.5m	W	S-St				
			1.0				×,]			
			- 1.5 — -		SPT1.50-1.95 m 5,9,16 N = 25		*								
			2.0				 *								
	L		2.5-				~			M-O					
			-				×								
			3.0	<u>3.00</u> 13.18	SPT3.00-3.45 m 8,11,15 N = 26		×	СН	Silty CLAY, high plasticity, grey, with up to 50% zones of Silty CLAY, low to medium plasticity, orange-brown, with a trace of ironstone gravel, fine to medium		-				
			3.5				×`		grained, angular						
ADT		¥ ₩0	4.0				×^								
			4.5-		SPT4.50-4.95 m		×,				<u>т</u>	 			
	1		5.0				× 				VSt-				
			5.5				×`			G					
	м		6.0 — -		SPT6,00-6.45 m 8,10,10 N = 20		×	-							
			6.5-				×	0							
			7.0-				×								
			7.5		SPT7.50-7.95 m 10,17,22 N = 39		*`								
			-		10,17,22 N = 39		* 								

REPORT OF BOREHOLE: BH2

CLIENT: PROJECT: LOCATION:

JOB NO:

Johnson Property Group Proposed Pumping Station Pitt Town

05623002

POSITION: Location of Manhole COORDS: 302113.9 m E 6282381.7 m N 56 MGA94 DRILL RIG: Hydrapower Scout V SURFACE RL: 16.18 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 12.45 m

SHEET: 2 OF 2 DRILLER: Macquarie Drilling LOGGED: JKM/RMP DATE: 9/8/07 CHECKED: PD DATE: 21/8/07

	Drilling			Sampling			Field Material Desc	iptic	on				
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			\sum	8.0				×	СН	Silty CLAY, high plasticity, grey, with up to 50% zones of Silty CLAY, low to medium plasticity, orange-brown, with a trace of ironstone gravel, fine to medium grained, angular			ALLUVIAL SOIL
12:13:15 PM		М		9.0	<u>9.00</u> 7.18	SPT9.00-9.45 m 7,12,16 N = 28				Silty/ Sandy CLAY, as above		H-‡SV	
0-BETA-PH.GDT 21/08/2007	ADT							× × * * *			D		
TION/TPLOGS.GPJ GAP6_I				10.5	10.60 5.58	SPT10.50-10.95 m 4,12,14 N = 26			CI CH	Silty CLAY, high plasticity, as above Silty Sandy CLAY, medium to high plasticity, red-brown mottling, with some zones of low to medium plasticity, and a trace of fine angular ironstone gravel		EN.	
TEL TOWN PUMPING STA		L		11.5 - - 12.0		SPT12.00-12.45 m 6.8.12 N = 20						H-153	
dwsN				-	12 45			<u>x.</u>					-
NMOT TTIE - NOSNHOL				12.5	3,73					END OF BOREHOLE @ 12.45 m Reached target depth Boreholes left open for water level monitoring			
-NVIR0405623002				- 13.5 — - -									
105PR0J001-050V				14.0									
GLB FULL PAGE J				14.5 - - 15.0	-								· · · · · · · · · · · · · · · · · · ·
3ETA_NEW ONE_30.1.07				- - 15.5									
GAPD_U-E				16.0 —	I Thi geote	s report of borehole r achnical purposes on for information only a	nus ly, v and	st be n withou I do no	ead it att ot ne	I	s. It pot ndwa	has t entia ater o	been prepared for I contamination are ontamination. GAP gINT FN. F01a RL2

	Golde	r Mes	ΕX	(PLA	NATION C	F NOTE: BOREH	S, AB OLE A	BRE	VIATIONS & TERMS TEST PIT REPORTS
DRILLI	NG/EXCAVA	TION ME	THOD						
AS*	Auger Screv	wing		RD	Rotary blade o	r drag bit	ŀ	HQ	Diamond Core - 63 mm
AD*	Auger Drillir	ng		RT	Rotary Tricone	bit	1	NMLC	Diamond Core - 52 mm
*V	V-Bit			RAB	Rotary Air Blas	st	1	NQ	Diamond Core - 47 mm
*T	TC-Bit, e.g.	ADT		RC	Reverse Circu	lation	- E	ЗH	Tractor Mounted Backhoe
HA	Hand Auger	r		PT	Push Tube		E	ΞX	Tracked Hydraulic Excavator
DTC	Diatube Cor	ring		CT	Cable Tool Rig)	E	ΞE	Existing Excavation
WB	Washbore of	or Bailer		JET	Jetting		ŀ	HAND	Excavated by Hand Methods
PENET	RATION/EXC	CAVATIO	N RES	ISTANC	E				
L	Low resista	ance. Ra	pid pen	etration	possible with lit	tle effort from	the equi	ipment	used.
М	Medium res	sistance.	. Exca	ation/p	ossible at an acc	eptable rate	with mod	lerate e	ffort from the equipment used.
Н	High resist significant e	ance to p effort from	penetrat the eq	tion/exc uipmen	avation. Furthei t.	penetration i	s possib	le at a s	slow rate and requires
R	Refusal or the digging	Practica impleme	l Refus	al. No achine.	further progress	possible with	out the r	isk of d	amage or unacceptable wear to
These a of exca	assessments vation or drilli	are subje ng tools,	ective and the	nd are o experi	lependent on ma ence of the oper	any factors in ator.	cluding t	he equi	pment power, weight, condition
WATER	2								
2	Z Wa	ter level a	at date	shown		\triangleleft	Partial w	ater los	SS
	> Wa	ter inflow	1				Complet	te water	loss
GROUN	IDWATER N	ОТ	The ot water,	servatio surface	on of groundwat seepage or cav	er, whether p e in of the bo	oresent o rehole/te	or not, v st pit.	was not possible due to drilling
GROUN ENCOU	DWATER N	OT	The bo presen been le	orehole/ it in less eft open	test pit was dry permeable stra for a longer per	/ soon after ta. Inflow ma iod.	excavati ly have b	ion. H been ob	owever, groundwater could be served had the borehole/test pit
SAMPL	ING AND TE	STING							
SPT		Standard	d Penet	ration T	est to AS1289.6	.3.1-1993			
4,7,11	N=18	4,7,11 =	Blows	per 150	mm. N = Blow	s per 300mm	penetra	tion foll	owing 150mm seating
30/80m	m	Where p	ractical	refusal	occurs, the blow	vs and penetr	ation for	that int	erval are reported
HW		Penetral	tion occ	urred u	nder the hamme	r and rod wei	aht only		
НВ		Hammer	- double	e bounci	ing on anvil				
DS		Disturbe	d samp	le					
BDS		Bulk dist	urbed s	sample					
W		Water S	npie ample						
FP		Field pe	rmeabil	ity test o	over section note	ed			
FV		Field val	ne shea	r test e:	xpressed as und	orrected shea	ar streng	th (s _v =	peak value, sr = residual value)
PM		Pressure	emeter	test ove	r section noted				
PP		Pocket p	enetro	meter te	st expressed as	instrument re	eading in	i kPa	
063		i hin wal	ied tube	e sampl	e - number Indic	ates nominal	sample	alamete	er in millimetres
R =	g or visually	upserva isible evid	able Co dence r	ontamin of contai	ation and Odou	$\frac{1}{R} = \Delta$	Soll con	n-natur	uon assessment projects)
R =	1 Sligh	t evidend	e of vis	ible cor	ntamination	R = B	Slight	non-na	tural odours identified
R =	2 Visib	le contar	nination	1 	tion	R=C	Moder	rate nor	n-natural odours identified
		MEDY		itamina	lion	K=D	1 Strong	j non-ni	atural odours identified
TOD -	JOKE RECO	VERY	92.3	00	D - Colid Core	Doonucru /0/)		000	- Rook Quality Designation (9/)
1 GR -	Total Core R	ecovery (/0)	- 50		necovery (%)	1	KQD :	- Nook Quality Designation (%)
= Leng	th of core reco	vered up × 10	0 :	<u>Len</u>	gth of cylindrical c	ore recovered	×100	<u>_</u> <u>Σ</u> Α	xial lengths of core > 100 mm Length of core sum
20	ingin or obient				Lengin of core	iun ·			congin or core ran

Golder	METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS
FILL	CLAY (CL, CI or CH)
。 ⁸ ひっし ⁹ ひっし っこの ⁹ ひっし ⁹ ひっし	ビュンタ 2 立立 3
SAND (SP or SW)	
SILT (ML or MH)	
Combinations of these basic symbols may	be used to indicate mixed materials such as sandy clay.
CLASSIFICATION AND INFERRED Soll and Rock is classified and describe	STRATIGRAPHY In Reports of Boreholes and Test Pits using the preferred method given in



MOISTURE CONDITION

Symbol D Μ W

Description Term Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery. Dry Moist Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere. Soils exude free water. Sands and gravels tend to cohere. Wet

AS1726 - 1993

CONSISTENCY AND DENSITY

CONSIST	ENCY AND DE	NSITY	AS17	26 - 1993		
Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index %	SPT "N" #
VS	Very Soft	0 to 12 kPa	VL.	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
Н	Hard	Above 200 kPa		-		

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

SPT correlations are not stated in AS1726 - 1993, and may be subject to corrections for overburden pressure and equipment type.



TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

0 menorm			
Symbol	Term	Point Load Index, Is ₍₅₀₎ (MPa)	Field Guide
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
М	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
Н	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
ĒΉ	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK STRENGTH TEST RESULTS

▼

S

V

Schistocity

Vein

- Point Load Strength Index, I_s(50), Axial test (MPa)
- Point Load Strength Index, Is(50), Diametral test (MPa)

Relationship between I_s(50) and UCS (unconfined compressive strength) will vary with rock type and strength, and should be determined on a site-specific basis. UCS is typically 10 to 30 x I_s(50), but can be as low as 5.

ROCK M	ATERIAL W	EATHERING								
Syr	nbol	Term			Field Guide					
F	RS	Residual Soil	Soil subst but th	developed on extremely tance fabric are no longer ne soil has not been signifi	weathered rock; the mass structure ar evident; there is a large change in volum cantly transported.					
E	W	Extremely Weathered	Rock disint	is weathered to such an e regrates or can be remould	extent that it has soil properties - i.e. it eithed, in water.					
	HW			strength usually changed loured, usually by iron	by weathering. The rock may be high staining. Porosity may be increased b					
DW	DW Distinctly Weathered		leach pores Weat typica	pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.						
s	W	Slightly Weathered	Rock to fre	is slightly discoloured but sh rock.	shows little or no change of strength relativ					
F	R	Fresh	Rock shows no sign of decomposition or staining.							
ABBREV	ATIONS FO	R DEFECT TYPES	AND DES	CRIPTIONS	· · · · · · · · · · · · · · · · · · ·					
Defect Ty B X C L	Defect Type B Bedding parting X Foliation C Contact L Cleavage			g or Infilling Clean Stain Veneer Coating or Infill	Roughness SI Slickensided Sm Smooth Ro Rough					
J Joint SS/SZ Sheared seam/zone (Fault) CS/CZ Crushed seam/zone (Fault) DS/DZ Decomposed seam/zone IS/IZ Infilled seam/zone			Planarit Pl Un St	ty Planar Undulating Stepped	Vertical Boreholes – The dip (inclination from horizontal) of the defect is given. Inclined Boreholes – The inclination					

measured as the acute angle to the

core axis.

Appendix B Laboratory Test Certificates

Golder Associates Pty Ltd 199 Franklin Street, Adelaide SA 5000

Atterberg Limits Test Report

Client:	Johnson Property Group,	······································	J	ob No.:	05623002	······				
	C/- Brown Consulting, PO Bo	x 6745, Bla	acktown, N	ISW , 2148						
Project:	Pitt Town - Pumping Station		R	eport No.:	05623002	/ R1				
Location:	Bootles Lane, Pitt Town		D	ate:	17 August	2007				
Test Procedu	ure: AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1									
Sample No.	Sample		Atterberg Limits							
	and Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkagé (%)	Moisture Content (%) *				
GA 9791	BH1 – 1.50 – 1.95m (CH) CLAY, high plasticity, brown.	52	17	35	10.5	17.4				
GA 9793	BH2 – 3.00 – 3.45m (Cł) CLAY, medium plasticity, brown.	36	13	23	8.0	14.7				
						· · · · ·				
Note:										
Sample Histor	Y : Air Dried									
Method of Prep	paration : Dry Sieved	•								
Size of Mould	: 250mm									
N,D, = not diete	ermined									
N.O. = not obta	ainable									
N.P. = non plas	stic									

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Approved Signatory:

Darren Shotton Laboratory Manager



Form AD1042.doc 121006

Golder Associates Pty Ltd 199 Franklin Street, Adelaide SA 5000



Approved Signatory, Darren Shotton - Laboratory Manager



Envirolab Services Pty Ltd

ABN 37 112 535 645 54 Frenchs Rd Willoughby NSW 2068 ph 02 9958 5801 fax 02 9958 5803 email: tnotaras@envirolabservices.com.au

CERTIFICATE OF ANALYSIS 13012

Client:

Golder Associates 88 Chandos St St Leonards NSW 2065

Attention: Jessica McIlveen

Sample log in details:

Your Reference: No. of samples: Date samples received: Date completed instructions received: 05623002, Pitt Town 2 Soils 10/08/07 10/08/07

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 15/08/07 Date of Preliminary Report: Not Issued Issue Date: 14/08/07 NATA accreditation number 2901. This document shall not be reproduced except in full. This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Results Approved By:

Jacinta/Hurst

Operations Manager

Envirolab Reference: 13012 Revision No: R 00



Page 1 of 5

Client Reference: 05623002, Pitt Town

Miscellaneous Inorg - soil Our Reference: Your Reference Depth Type of sample	UNITS	13012-1 BH1 4.50m Soll	13012-2 BH2 0.50m Soll
pH 1:5 soll:water	pH Units	4.6	4.8
Electrical Conductivity 1:5 soil:water	µ\$/cm	960	640
Sulphate, SO4 1:5 soil:water	mg/kg	170	520
Chloride 1:5 soil:water	mg/kg	1,200	310



Envirolab Reference: 13012 Revision No: R 00



Page 2 of 5

Client Reference: 05623002, Pitt Town

Method ID	Methodology Summary					
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.					
LAB.2	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA2510 20th ED and Rayment & Higginson.					
LAB.9	Sulphate determined turbidimetrically.					
LAB.11	Chloride determined by argentometric titration.					

Envirolab Reference: 13012 Revision No: R 00



Page 3 of 5

Client Reference: 05623002, Pitt Town

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorg - soli	-					Base II Duplicate II %RPD		
pH 1:5 soil:water	pH Units		LAB.1	[NT]	13012-1	4.6 [N/T]	LCS-1	101%
Electrical Conductivity 1:5 soil:water	µS/cm	1	LAB.2	<1.0	13012-1	960 950 RPD: 1	LCS-1	105%
Sulphate, SO4 1:5 soil:water	mg/kg	25	LAB.9	<25	13012-1	170 [N/T]	LCS-1	112%
Chloride 1:5 soil:water	mg/kg	100	LAB.11	<100	13012-1	1200 [N/T]	LCS-1	100%

Envirolab Reference: 13012 Revision No: R 00



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Report Comments:

Asbestos analysed by: Not applicable for this job

INS: Insufficient sample for this test RPD: Relative Percent Difference NR: Not requested NT: Not tested NA: Test not required <: Less than PQL: Practical Quanitation Limit LCS: Laboratory Control Sample >: Greater than

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. **LCS (Laboratory Control Sample)**: This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of Interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria:

Duplicates: <5xPQL - any RPD is acceptable;</th>>5xPQL - 0-50% RPD is acceptable.Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for
SVOC and speciated phenols is acceptable.Surrogates: Generally 60-140% is acceptable.

Envirolab Reference: 13012 Revision No: R 00



Page 5 of 5

Appendix C Important Information about your Geotechnical Engineering Report

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfil the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. And no one – not even you – should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include : the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was :

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical change that can erode the reliability of an existing geotechnical engineering report include those that affect :

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *Geotechnical Engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by : the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalise their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation*.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognise that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available

to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognise that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labelled "limitations", many of these provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognise their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE member geotechnical engineer for more information.



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F13 APPENDIX D:

ECOLOGIST REPORT – FLORA & FAUNA

MAUNSELL AECOM



Proposed Pump Station and Rising Main

Flora and Fauna Assessment Report

Johnson Property Group 09 July 2008

Proposed Pump Station and Rising Main

Prepared for

Johnson Property Group

Prepared by

Maunsell Australia Pty Ltd

Level 11, 44 Market Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia T +61 2 8295 3600 F +61 2 9262 5060 www.maunsell.com ABN 20 093 846 925

09 July 2008

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Quality Information

Document	Proposed Pump Station and Rising Main				
Ref	60023107 \\ausyd1fp001\projects\60023107_ptss&d\8_issued_docs\8.1_reports\draf t ref\ref appendices for rev s\app d flora&fauna\pitt town flora and fauna report rev a.doc				
Date	09 July 2008				
Prepared by	Paul Rossington				
Reviewed by	Dr Gillian Eckert				

Revision History

Revision	Revision Date	Details	Authorised		
			Name/Position	Signature	
		Preliminary (Not for Submission)	Geoff Hudson Team Leader - Environment		
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Executive Summary

This Flora and Fauna Assessment Report has been prepared to assess the construction and operation of a sewage pumping station and sewer main at Pitt Town. The location of this sewerage infrastructure is constrained by a number of factors including land ownership, landscape characteristics and potential conflicts with existing and proposed infrastructure. Potential environmental impacts, including flora and fauna impacts, also represent a constraint to design.

Three threatened species, the endangered Cumberland Land Snail *Meridolum corneovirens* and the vulnerable plants Downy Wattle *Acacia pubescens* and *Dillwynia tenuifolia* were detected on or close to the proposed route of the sewerage mains during site investigations. One threatened ecological community, *Shale Gravel Transition Forest*, would be affected by the proposed action.

Consultation between the proponent, Maunsell ecologists, heritage consultants, relevant NSW government agencies and the Hawkesbury City Council representatives has been conducted in order to minimise the potential impact on flora and fauna whilst considering other important constraints.

The resulting design and construction methodology, together with the implementation of the mitigation measure contained herein is considered sufficient to mitigate impacts on flora and fauna such that a significant adverse impact is unlikely to result.

1.0 Background to the Study

Johnson Property Group (the proponent) is developing a new residential area at Pitt Town approximately 60 km north-west of Sydney (Figure 1). This Flora and Fauna Assessment Report has been prepared as part of a Review of Environmental Factors (REF) (Maunsell 2008) seeking approval from Hawkesbury City Council, as determining authority, under Part 5 of the *Environment Planning and Assessment Act* 1979 (EP&A Act) for the construction and operation of a sewage pumping station and sewer main to serve future development at Pitt Town.



Figure 1 Locality map of Pitt Town

Source - Lands 2007

1.1 Objectives of the Flora and Flora Assessment

The objectives of the assessment are to:

- Determine if any species, population or ecological community would be significantly affected by the proposal,
- Recommend measures to minimise impacts on flora and fauna,
- Recommend measures to offset residual impact on flora and fauna, and
- Recommend any additional assessment that may be required.

1.2 Legislative Requirements

The EP&A Act and EP&A Regulation provide the statutory context for assessment of the proposed sewerage pump station and rising main. The proposal is to be assessed under the provisions of Part 5 of the EP&A Act with Johnson Property Group the proponent and Hawkesbury City Council the consent authority.

The EP&A Act is supplemented by a number of Environmental Planning Instrument's (EPIs) including:

- State Environmental Planning Policies (SEPPs)
- Regional Environmental Plans (REPs)
- Local Environmental Plans (LEPs)
- Other planning policies and guidance statements.

Relevant legislation that applies to the proposed sewerage works is described in the following sections.

1.3 NSW Legislation

1.3.1 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) outlines the protection of threatened species, communities and critical habitat in NSW. The Act is administered by the Department of Environment and Climate Change (DECC). Section 91 of the TSC Act requires that a license be obtained should a development result in one or more of the following:

- Harm to any animal that is of, or is part of, a threatened species, population or ecological community
- The picking of any plant that is of, or is part of, a threatened species, population or ecological community
- Damage to critical habitat
- Damage to habitat of a threatened species, population or ecological community.

In accordance with section 5A of the EP&A Act, a Seven Part Test would be undertaken to determine the significance of the effect on a particular species or EEC. Should this determine that the project would result in a significant impact on the threatened species, population or EEC then a Species Impact Statement (SIS) would be required. Concurrence would be required from the Director General of the Department of Environment and Climate Change. Accordingly, a copy of the REF and associated assessments under the NSW TSC Act will be forwarded to the DECC.

Based on the outcome of Seven Part Tests, the current project has the potential to impact upon EEC's listed under Schedule 1 of the TSC Act but the impact is not likely to be significant and a SIS is therefore not required.

1.3.2 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) regulates the clearing of all native vegetation on land in NSW except land listed under Schedule 1 of the Act. Excluded land includes land in the local government area of Hawkesbury in the urban area of Sydney. Since the project falls within this local government area, the NV Act does not apply.

1.3.3 National Parks and Wildlife Act 1974

The purpose of this the *National Parks and Wildlife Act 1974* (NPW Act) is to provide the primary basis for protection and unwarranted destruction of relics of high cultural significance – both Indigenous and non-Indigenous value. In addition, the NPW Act also provides a framework to conserve native

terrestrial flora and fauna species and manage areas of conservation value such as Nature Reserves, which includes:

- a Section 87(1) permit may be required to conduct preliminary research or excavate any potential archaeological deposits and relics located along the works corridor
- a Section 90(2) Permit (i.e. consent to destroy) may be required to disturb, destroy, deface or damage any relic, sites or Aboriginal Places
- it is an offence to harm, trade, possess or damage critical habitat or the habitat of any threatened species without obtaining a Section 120 licence.

DECC also provides guidelines for standard archaeological reporting and assessment (NPWS 1997). These guidelines are currently being updated and are in draft form (NPWS 2003).

The NPW Act requires that a permit from the Director General be obtained before archaeological fieldwork involving disturbance to an Aboriginal site is carried out. Queries and applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork, should be directed to the Cultural Heritage Unit Manager at the relevant DECC Aboriginal Heritage Division regional Office.

1.3.4 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides a framework of protection for the extraction of water and structural change to existing watercourses. More specifically, the Water Management Act 2000 provides that certain types of development and activities that are carried out in or near a river, lake or estuary are controlled activities. A controlled activity includes the following:

- the erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or
- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or
- the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

Section 344(1)(a) requires that a person must not carry out a controlled activity in, or under waterfront land otherwise than in accordance with a controlled activity approval (CAA). The proposed rising main works are within 40 m of Hortons and Mckenzies watercourses and therefore require a CAA under the WM Act.

On 4 February 2008 an application was made to the Department of Water and Energy to obtain a Controlled Activity Approval (CAA) issued under '*Part 3 – Approvals*' of the WM Act. On 7 March 2008 the CAA was issued by Department of Water and Energy (refer Appendix D of REF for details). The CAA permits the proponent to undertake works for a sewer main on waterfront land for McKenzies, Horton Creeks and tributary of Hawkesbury River- Pitt Town and McGraths Hill, NSW. The CAA is issued for a period of five years and expires on 7 March 2013. Conditions in the CAA are listed in Appendix D of the REF and should be incorporated during project execution.

1.3.5 Fisheries Management Act 1994

The *Fisheries Management Act 1994* and *Fisheries Management Amendment Act 1997* provide for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Permits are required for any dredging or reclamation works, any harm to marine vegetation or any obstruction to fish passage. The proposal will not affect aquatic ecosystems and no permits are required under either of these Acts.

1.4 Commonwealth Legislation

1.4.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) governs the Commonwealth Environmental Assessment process and provides protection for matters of National Environmental Significance (NES), which include:

- Nationally threatened species and ecological communities
- Australia's World heritage properties
- Ramsar wetlands of international importance
- Migratory species listed under the EPBC Act (species protected under international agreements)
- Commonwealth marine areas
- Nuclear actions, including uranium mining
- National heritage.

The EPBC Act is separate from other approvals (such as those under the *Threatened Species Conservation Act 1995*).

Given the outcomes of the ecological investigations conducted as part of this REF, together with consideration of the above guidelines, it is unlikely that there will be a significant impact to communities listed under the EPBC Act and therefore a referral to Department of Environment, Water, Heritage and the Arts (DEWHA) for information is not required.

1.5 Topography, Geology and Soils

Pitt Town is in a semi-rural area characterised by farming land. The study area lies to the north of the town centre. The surrounding landscape slopes gently away from the site towards the east and south. The topography of this site for the proposed pump station is relatively flat, with the site grade falling gently in a north-west to south-east direction. This area comprises of vegetated bushland. The topography of the route of the proposed rising main is also relatively flat, with a slight grade falling in a south-west direction.

The 1:50,000 geology map for Windsor indicates that the site locality is underlain by Tertiary deposits with a verity of materials including sand and loam, clay, claystone and sandstone, conglomerate, laterite, and lateritised gravel.

A geotechnical investigation has been carried out by Golder Associates and a report issued; Geotechnical Investigation Proposed Residential Development Pitt Town, NSW (RCA document Number 05623002/12) dated June 2005. Appendix D of the REF discusses the geotechnical investigation of the site in relation to the proposed works. Based on the information available, it can be deduced that:

- Ground condition is relatively consistent across the study site.
- Soils generally compromise of sand and clay mixtures.
- Bedrock was not encountered with the depth of investigation.
- The eastern half of the site the profile is predominantly clay with a variable surficial layer of silt and sand.
- Seepage was encountered to a depth of 0.7m 2 m in several of the test pits.
- The site of the proposed works would not be located in an area subject to landslip.

There are no known acid sulfate soils on the site. If a change to the scope of works is required and the potential for acid sulfate soils or contamination arises, a management plan will be developed to ensure compliance with DECC requirements.

2.0 Methodology

2.1 Study Area

The site and surrounds of the proposed pump station and the entire rising main route (see Appendix A of the REF) was visually inspected. Visual inspection was used to determine which areas required detailed investigation of flora and fauna.

Much of the route of the proposed sewerage main is within existing road reserves and cleared land and works in these areas are considered unlikely to cause significant impacts on flora and fauna. The initial inspection showed that other areas potentially affected by the proposal contain native vegetation and fauna habitat. These areas were designated as the study area for further ecological studies. The ecology study area is shown in **Figure 2**.

2.2 Desktop investigation

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened flora or fauna species listed under the TSC Act or EPBC Act have been recorded or predicted to occur within a 10km radius of the ecology study area.

The DECC threatened species profile of each of these species was reviewed in order to determine which of these species have the potential to occur on the site on the basis of the habitat characteristics present.

2.3 Seasonal and Weather Conditions

Three site visits were conducted for the flora and fauna survey. The weather condition on these days is described in **Table 1** below.

Date	Approximate temperature range	Wind	Weather
29 March 2007	24-27	Light	Fine
24 April 2007	18-22	Moderate	Light rain
3 April 2008.	26-29	Light	Fine

Table 1 Seasonal and weather conditions

This range of conditions during the field survey is considered to be conducive to the detection of the flora and fauna species targeted.

2.4 Staff undertaking survey and assessment

Field surveys were undertaken by Paul Rossington. Assistance with desktop investigations, impact assessment and peer review was provided by Dr Gillian Eckert.

Paul Rossington has completed a Bachelor of Science Degree, majoring in botany, zoology and ecology and a Post-graduate Diploma of Wildlife Management. Paul holds a current DECC Scientific License for flora and fauna studies.

Gillian holds a Bachelor of Science (Hons) in zoology and a PhD in marine ecology.

2.5 Flora Survey Methodology

2.5.1 Flora and vegetation communities

Three site visits were conducted to assess the likely impact of the proposed action on the flora of the locality. This involved the investigation of the structure, condition and composition of vegetation communities present and a targeted search for threatened flora species in the sections of the proposed rising main route which pass through areas of native vegetation and the site of the pump station. The distribution of vegetation communities shown in existing mapping (NPWS 2002) was ground truthed

Plant species were identified with reference to the Harden (2007).

A total of 10 person hours was spent on flora surveys as per Table 2 below.

Survey Unit	Number of Units	Duration (hours per unit)	Total Effort (hours)
Flora Quadrat (400 sq.m)	2	2.5	5
Targeted Search for Threatened Flora	4	0.75	3
Condition Assessment	4	0.5	2
Total Effort	-	-	10

Table 2 Flora and Vegetation Survey Effort

2.6 Fauna Survey Methodology

Given the limited extent of habitat available on the site and the extent of the proposed activities, a detailed field survey of fauna species was considered unnecessary.

Three site visits were conducted, however to assess habitat attributes, survey diurnal birds and reptiles, search for signs of animal activity and to conduct targeted searches for the Cumberland Land Snail *Meridolum corneovirens*. Diurnal bird censuses were conducted on separate days in the vicinity of the pump station and rising main.

Three habitat searches for the Cumberland Land Snail, of six person hours total duration, were conducted in the precise location of the pump station, in the adjacent SGTF remnant, and in potential habitat along the route of the rising main between Bootles Lane and Cattai Road and between Old Pitt Town Road and Hortons Creek.

A conservative approach was taken in the assessment of the likelihood of occurrence of threatened fauna species in order to account for the limited extent of field survey undertaken.

A total of 12 person hours was spent on fauna surveys as per Table 3 below.

Survey Unit	Number of Units	Duration (hours per unit)	Total Effort (hours)
Fauna Habitat Assessment	4	0.5	2
Targeted Search for Cumberland Land Snail	3	2	6
Tracks, Scats and Signs Search	4	0.5	2
Diurnal Bird Survey	4	0.5	2
Total Effort	-	-	12

Table 3 Fauna Survey Effort

3.0 Flora Results

3.1 Vegetation of the Study Area

The vegetation communities and the location of threatened flora and fauna are shown in **Figure 2**. This figure is based on site investigations and NPWS (2002) vegetation mapping.





Much of the route of the proposed rising main is within existing road reserves and cleared land. The section of the proposed rising main that has potential to cause direct impacts to native vegetation and fauna habitat is shown in Figure 2 and assessed below.

The site of the proposed pump station and access road is adjacent to a remnant of Shale Gravel Transition Forest in the Sydney Basin Bioregion (SGTF), an Endangered Ecological Community (EEC) under the TSC Act. This community is not listed under the EPBC Act. The area that would be occupied by the pump station and access road has previously been cleared and is dominated by exotic vegetation including Kikuyu Grass *Pennisteum clandestinum* and *Bidens pilosa* though some native groundcover species including *Juncus usitatus, Oplismenus aemulus* and *Eriochloa pseudoacrotricha* and a few isolated trees remain (Figure 3)

Scattered individuals of *Eucalyptus* spp. and *Melaleuca decora* also occur here. The adjacent wooded area to the north and east contains relatively intact SGTF. There is evidence of previous partial clearing and regrowth of this woodland. Approximately ten individuals of *A. pubescens* occur in this remnant. *A. pubescens* has a suckering habit and thus this count is based on the number of distinct clumps (1-4 m in width with 1-20+ stems) rather than the number of stems The precise number of genetic individuals is hence unknown. This area would not be directly affected by the proposed works.

Figure 3 Vegetation cover at the site of the proposed pump station



The unformed section of Bootles Lane between the existing sealed section of Bootles Lane and Cattai Road contains SGTF. This section of the route consists of a previously cleared and disturbed middle strip (dirt track in northern half) approximately 4m in width with strips of vegetation on each side. Each strip of vegetation is approximately 8m in width. The vegetation here varies in condition and is a mix of native and exotic species though most of its extent remains recognisable as SGTF. The highly disturbed middle strip contains areas of bare soil, patches of exotic grasses and forbs and piles of logs and rubbish and would not be considered to be SGTF in its current form. The canopy is dominated by Red Ironbark *Eucalyptus fibrosa* and Grey Box *Eucalyptus molucanna*. Two clumps of Downy Wattle *Acacia pubescens*, listed as Vulnerable under both the TSC Act and the EPBC Act, are present on the south-western side of the middle strip, in the northern half of this section (See Figure 2).

The road reserve on the north-western side of Cattai Road, from Buckingham Street for approximately 70m north-east contains disturbed SGTF. This section of SGTF would not be affected by the proposed works as the rising main would be constructed on the south-eastern side of Cattai Rd.

The road reserve on the south-eastern side of Cattai Road is dominated by exotic grasses including *Eragrostis curvula* and is largely free of native vegetation with the exception of a discontinuous canopy of *Eucalyptus* species.

Several specimens (8 stems) of *Acacia pubescens* occur in a small patch of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43.

The section of the rising main route between Cattai Road and Old Pitt Town Road traverses a partially cleared parcel of land. This area contains scattered trees but has minimal understorey vegetation. No shrub species are apparent here though small eucalypts (less than 1m) are scattered throughout the groundcover layer. The lack of shrubs and larger eucalypt regrowth is likely as a result of regular mowing or grazing. The ground layer here consists primarily of a mix of native and exotic grasses and

forbs. No threatened plant species were recorded here and given the previous and ongoing disturbance to this vegetation, none are considered likely to occur. Despite being highly disturbed, this vegetation is considered to conform to the description of SGTF.

The route of the rising main continues south of Old Pitt Town Road where it passes through a patch of disturbed SGTF before crossing Hortons Creek, a tributary of Pitt Town Lagoon. This patch of SGTF contains approximately 25-30 individuals of *Dillwynia tenuifolia* which is listed as a Vulnerable species under both the TSC and EPBC acts.

After crossing Old Pitt Town Road, the route continues along the southern side of the road for approximately 50 metres to the west, crossing Hortons Creek, a tributary of Pitt Town Lagoon. The route avoids the nearby patch of SGTF which contains approximately 25-30 individuals of *Dillwynia tenuifolia* which is listed as a Vulnerable species under both the TSC and EPBC acts.

Where the rising main crosses Hortons Creek it passes through a small patch of degraded riparian vegetation consisting primarily exotic plant species including kikuyu grass *Pennisetum clandestinum*, blackberry *Rubus fruticosus species complex*, morning glory *Ipomoea indica*, with cumbungi *Typha orientalis* the only abundant native species. Noxious aquatic weed species (e.g. Alligator Weed *Alternanthera philoxeroides*) are known to occur in the region. No noxious aquatic weeds were found at the location of the creek crossing and hence the likelihood that the proposed works would contribute to the spread of these species is considered to be low. Other creek crossings are within cleared and disturbed environments and would be under-bored. With the implementation of the mitigation measures described herein significant impacts on riparian vegetation in these areas is unlikely.



Figure 4 Vegetation within the unformed section of Bootles lane (facing south)

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any additional threatened plant species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there are a number threatened species recorded in the vicinity of the site. The likelihood of occurrence of these species based on previous records and habitat attributes is summarised in **Appendix D**. Those species which were considered to have a moderate to high likelihood of occurring on the site on the basis of distribution and habitat requirements are shown in **Table 4** below.

Table 4 Threatened flora with potential to occur in study area

Species Name	Status	Likelihood of Occurrence	Database / Act	
Acacia pubescens Downy Wattle	Vulnerable	Recorded on site	EPBC, TSC	
Dillwynia tenuifolia	Vulnerable	Recorded on site	EPBC, TSC	
<i>Grevillea juniperina subsp. juniperina</i> Juniper-leaved Grevillea	Vulnerable	Moderate	TSC	
<i>Pimelea spicata</i> Spiked Rice-flower	Endangered	Moderate	EPBC, TSC	
Pultenaea parviflora	Vulnerable (EPBC) Endangered (TSC)	Moderate	EPBC, TSC	
Persoonia nutans Nodding Geebung	Endangered	Moderate	EPBC, TSC	
Reference: DECC 2008				

4.0 Fauna Results

4.1 Fauna Habitats and Corridors of the Study Area

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened fauna species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there were a number threatened species recorded in the vicinity of the site. The likelihood of occurrence in the ecology study area of these species based on previous records and habitat attributes is summarised in **Appendix D**. The species which are considered to have a moderate to high likelihood of utilising the habitats of the ecology study area are shown in Table 5.

One threatened fauna species, the Cumberland Land Snail *Meridolum corneovirens* was recorded in the ecology study area during the visits. This species was recorded in the patch of SGTF within the ecology study area south of Old Pitt Town Road. This species was not recorded elsewhere in the ecology study area during targeted searches. The fauna species recorded during the site visit are shown in **Appendix A**.

Habitat for a variety of fauna species exists within the remnant SGTF areas occurring within the study site as described below.

Eucalypts, (*Eucalyptus* spp.), Wattles (*Acacia* spp.) and Paperbarks (*Melaleuca* spp.) provide a food source in the form of leaves, sap, nectar, pollen and seed for a number of bird, mammal and insect species. Threatened species with a moderate to high likelihood of using this resource include *Pteropus poliocephalus* (Grey-headed Flying-fox), *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Melithreptus gularis* (Black-chinned Honeyeater), *Phascolarctos cinereus* (Koala) and *Petaurus australis* (Yellow-bellied Glider). The migratory nectar-feeding birds *Lathamus discolor* (Swift Parrot) and *Xanthomyza phrygia* (Regent Honeyeater) may use this resource sporadically or on a seasonal basis.

Foraging habitat for insectivorous bird species exists in the canopy, understorey and groundcover levels of the SGTF. Threatened species which may use this resource include *Climacteris picumnus* (Brown Treecreeper) and *Pyrrholaemus sagittatus* (Speckled Warbler).

Large and medium-sized tree hollows were observed in the ecology study area to the north of the location of the pump station (see photos in **Appendix B**). Small hollows and fissures may also exist within the dead standing trees of the site. These hollows provide potential den, nest and roost sites for a number of bird, mammal and reptile species.

Threatened species which may use large hollows include *Tyto novaehollandiae* (Masked Owl), *Ninox strenua* (Powerful Owl), *Ninox connivens* (Barking Owl), *Petaurus australis* (Yellow-bellied Glider), *Callocephalon fimbriatum* (Gang-gang Cockatoo).

Smaller hollows may be used by hollow-roosting bats including *Falsistrellus tasmaniensis* Eastern False Pipistrelle, *Mormopterus norfolkensis* (Eastern Freetail-bat), *Scoteanax rueppellii* (Greater Broad-nosed Bat).

In addition to the bat species listed above, several other threatened, non hollow-roosting species may forage in the air spaces within and around the vegetation including *Chalinolobus dwyeri* (Large-eared Pied Bat) and *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

Threatened predatory birds including the owl species listed above and *Lophoictinia isura* (Square-tailed Kite) may hunt in the woodland of the ecology study area and nearby areas.

The leaf-litter, fallen logs and grass clumps of the ecology study area form potential habitat for the endangered Cumberland Land Snail *Meridolum corneovirens*.

The EPBC act search also showed that 14 migratory terrestrial, wetland and marine species protected under the act are likely to occur in the area. Of these the following species have moderate to high potential to occur on the site with respect to habitat attributes; *Hirundapus caudacutus* (White-throated Needletail), *Merops ornatus* (Rainbow Bee-eater), *Monarcha melanopsis* (Black-faced Monarch), *Myiagra cyanoleuca* (Satin Flycatcher), *Rhipidura rufifrons* (Rufous Fantail), *Xanthomyza phrygia* (Regent Honeyeater), *Ardea ibis* (Cattle Egret)and *Apus pacificus* (Fork-tailed Swift).

The waterways of the ecology study area and locality of the proposed rising main are presently subject to impacts associated with increased nutrients, sedimentation, weed invasion and the presence of exotic fish species. Only common native fish and frog species that are capable of persisting in highly disturbed waterways are considered likely to persist here. Although Hortons Creek contains some potential habitat for the Green and Golden Bell Frog *Litoria aurea*, this species is not considered likely to occur here due to the poor condition of the waterway and the fact that the species has not been recorded in the Hawkesbury LGA since the late 1970's.

The Black-faced Monarch, Satin Flycatcher and Rufous Fantail may breed in the area.

Species Name	Status	Likelihood of Occurrence	Database / Act
Callocephalon fimbriatum Gang-gang Cockatoo	Vulnerable	Moderate to High	TSC
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat, Large Pied Bat	Vulnerable	Moderate to High	EPBC, TSC
<i>Climacteris picumnus</i> Brown Treecreeper	Vulnerable	Moderate to High	TSC
Falsistrellus tasmaniensis Eastern False Pipistrelle	Vulnerable	High to Moderate	TSC
<i>Lathamus discolor</i> Swift Parrot	Endangered	Moderate	EPBC, TSC
<i>Lophoictinia isura</i> Square-tailed Kite	Vulnerable	Moderate to High	TSC
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Moderate to High	TSC
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	Known in one section, Moderate to High in remainder.	TSC
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	Moderate to High	TSC
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	Moderate to High	TSC
Ninox connivens Barking Owl	Vulnerable	Moderate to High	TSC
Ninox strenua Powerful Owl	Vulnerable	Moderate to High	TSC

 Table 5
 Threatened flora and fauna species and the likelihood of occurrence

Species Name	Status	Likelihood of Occurrence	Database / Act	
<i>Petaurus australis</i> Yellow-bellied Glider	Vulnerable	Moderate	TSC	
Phascolarctos cinereus Koala	Vulnerable	Moderate to High	TSC	
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Moderate to High	EPBC, TSC	
<i>Pyrrholaemus sagittatus</i> Speckled Warbler	Vulnerable	Moderate to High	TSC	
Scoteanax rueppellii Greater Broad-nosed Bat	Vulnerable	High to Moderate	TSC	
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	Moderate to High	TSC	
<i>Xanthomyza phrygia</i> Regent Honeyeater	Endangered	Moderate	EPBC, TSC	
Reference: DECC 2008				

5.0 Impact Assessment

5.1 Impacts on vegetation and flora species

5.1.1 Construction

The construction of the proposed pump station and access road would require the removal of a small amount (approx 0.01 ha) of highly disturbed SGTF within the adjacent road corridor for the construction of the access road. The removal of approximately four live immature trees (*Eucalyptus* and *Melaleuca* spp.) and one dead standing tree would be required. Some damage to the root systems of remaining trees may also be caused by construction works. Most of the vegetation affected is not considered SGTF as it contains very few understorey or groundcover species which are listed in the threatened ecological community profile and Scientific Committee final determination. The ground layer in the location of the pump station is dominated by exotic species and the few native species are commonly found in a variety of vegetation communities, including highly disturbed environments.

The dominance of exotic species in this community is such that it would be unlikely to regenerate and would require a reconstructive approach to be returned to near natural structure. This area has the potential however to be rehabilitated and integrated into the existing remnant through weed removal and revegetation. The construction of the pump station thus limits the potential for the recovery of this SGTF remnant. The revegetation of the remaining areas of exotic vegetation and regeneration works in the retained SGTF adjacent to the pump station site would contribute to the offset of this impact

The earthworks required for the installation of the rising main would require the removal and/or disturbance of approximately 0.35 ha of disturbed SGTF on the eastern edge of the unformed section of Bootles Lane and between Cattai Road and Old Pitt Town Road.

There is some potential for adjacent areas of SGTF and isolated trees to be impacted upon in other parts of the rising main route within the ecology study area through damage to tree roots caused during the digging of the trench.

Construction of the pump station, access road and rising main has the potential to exacerbate the weed situation of the ecology study area by introducing additional weed species, spreading weeds and causing soil disturbance. There is also the potential for the introduction of plant pathogens such as Phytophthora Root Rot fungus *Phytophthora cinnamomi*. If the mitigation measures described below are implemented however, the overall condition of the vegetation of the ecology study area could be improved.

Several specimens (8 stems) of *Acacia pubescens* occur in a small isolated patch (approx 0.005 ha) of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43. Hand excavation or boring would be used if the route passes through any individuals of this species to minimise potential damage. It has been assumed in this assessment that these individuals would be damaged during excavation.

Accidental damage to *Dillwynia tenuifolia* is possible but the likelihood of this occurring would be low given the proposed sewerage main route, construction methodology and mitigation measures. The alignment of the sewerage main has been re-designed to avoid *Dillwynia tenuifolia* individuals and potential habitat. Significant impacts on this species are not considered likely.

Some indirect impact on the Freshwater Wetlands EEC as a result of the installation of the sewerage main under Hortons Creek is possible due to disturbance of the creek bed. Given the small extent and poor condition of this vegetation and the nature of the works, this impact is not likely to be significant.

Tests of significance (7-part tests) and EPBC Act significance assessments have been conducted for *Acacia pubescens, Dillwynia tenuifolia* and SGTF and have concluded that no significant negative impact on these is likely to occur as a result of the proposal (See **Appendix C**).

EPBC Act threatened species assessments are also included in **Appendix C** for the species considered likely to be affected and have also concluded that no significant impact on these species is likely to occur.

Several other threatened species have a moderate potential to occur in the ecology study area including *Grevillea juniperina subsp. juniperina, Pimelea spicata* and *Pultenaea parviflora*. These species may be present but have gone undetected during investigation due to a cryptic habit or occurrence in the form of a soil-stored seedbank. None of these species are likely however to exist in the disturbed vegetation of the earthworks areas and hence significant impacts on these species are considered unlikely.

5.1.1.1 Operation

No significant impacts on flora and fauna are considered likely during operation of the pump station and rising main.

5.2 Impacts on fauna species and habitat

The construction activities proposed would result in the permanent removal of a very small amount (approx. 0.05 Ha) of degraded foraging habitat in the location of the pump station for some of the mobile threatened species described above.

The removal of disturbed SGTF vegetation for the rising main, as described above, would result in the loss of some potential foraging habitat. The removal of hollow-bearing trees would have the greatest influence on the severity of impacts on a number of threatened hollow-dependent species. No removal of known hollow-bearing trees would be necessary for construction and the impact on hollow-dependent fauna would is not likely to be significant. Most of the trees affected are not of sufficient size to produce hollows and many are ironbarks, a group of eucalypts that do not readily form hollows.

Most of the threatened and migratory fauna species likely to occur are highly mobile and are unlikely to be killed or injured during earthworks or use the affected areas exclusively. The Cumberland Land Snail is at risk, if it occurs here, as it is small and slow-moving and hence would be unable to flee and may not be detected during earthworks. This species was not detected on the site of the proposed pump station during targeted searches in the earthworks area or in surrounding relatively intact SGTF. The habitat in the earthworks areas is considered sub-optimal due to a lack of leaf-litter and the paucity of fallen logs.

The Cumberland land Snail was however detected in the patch of SGTF between Old Pitt Town Road and Hortons Creek. The route of the sewerage main has been re-designed to avoid this habitat. A test of significance (7-part test) has been conducted for this species and has concluded that no significant negative impact on this species is likely to occur as a result of the proposal (See **Appendix C**).

The earthworks area would only comprise a small proportion of the foraging range of individuals of threatened bird, bat and arboreal mammal species and would not result in the removal of likely roosting or nesting habitat. Members of these groups are therefore unlikely to be significantly affected by the proposal.

Significant impacts on native fish species are considered unlikely to occur as the pumping station and rising main would not create any disruption to fish passage and would have minimal effect on the hydrology of any waterway. No threatened fish species been recorded in the waterways of the ecology study area. No further consideration has therefore been given to the potential occurrence or impact on fish species.

5.2.1.1 Operation

No significant impacts on flora and fauna are considered likely during operation of the pump station and rising main.

6.0 Recommended Mitigation Measures

6.1 Flora

The potential impacts on threatened flora species and ecological communities would be mitigated in a number of ways:

- The minimum practicable clearing of SGTF and trees would be conducted for construction purposes and threatened species would be avoided where feasible. Trenches in the vicinity of retained trees are to be hand-excavated or bored and are to proceed only with approval of the site arborist. Hand excavation and boring would also be used to avoid the removal of threatened plants (i.e Downy Wattle *Acacia pubescens*). Any pruning of retained trees would be undertaken by the site arborist.
- The choice of equipment used in the installation of pump station and rising main would ensure that the minimum amount of disturbance would be required for access and earthworks in areas containing native vegetation.
- Earth-working equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from work areas to minimise the likelihood of the spread of weed seeds and plant pathogens.
- Suitable control measures would be implemented to prevent erosion and sediment deposition as per the CEMP.
- Where practicable, minor alterations to the path of the rising main would be made to minimise impacts on SGTF, threatened plants and retained trees.
- Temporary fencing would be placed between areas containing threatened plant species and SGTF to be retained to exclude earthworks. Fencing would be placed outside the drip-line of trees where possible.
- Regeneration and revegetation of disturbed areas on and adjacent to the construction areas would be conducted using local provenance plant species indigenous to the SGTF EEC. This would include the entire area (0.5 Ha) of exotic vegetation and poor condition SGTF adjacent to the pump station (see **Figure 2**) and the entire unformed section of Bootles Lane. Revegetation of existing road corridors and areas zoned as future roads would be restricted to the installation of a weed-free mulch and the planting of native grasses and other native groundcover vegetation to prevent erosion. Where the sewer main causes damage to public parks, turf should be replaced after backfilling is completed.
- Bushland regeneration would be conducted by a suitably qualified and experienced contractor after the end of construction works in all areas of retained vegetation and revegetated areas. Weeds, especially Kikuyu Grass and noxious weeds, must be adequately controlled prior to revegetation and maintained at a low (less than 90% of current) density during this period.
- The distance between open trenches and retained trees would be maximised within the constraints imposed by existing and planned infrastructure such as roads and other services.
- All trees requiring removal for the construction of the pump station and access road would be cut into manageable lengths for use in habitat augmentation within the adjacent SGTF remnant.
- All other native vegetation cleared would be mulched and stockpiled on site for later use in soil stabilisation and vegetation rehabilitation. Mulch would be stockpiled in disturbed vegetation adjacent to the pump station and/or rising main so as to minimise disturbance to native vegetation and the spread of weeds. Advice would be sought from an ecologist to determine suitable locations for stockpiles.
- An ecologist or suitably experienced and licensed bushland regenerator would be present for all tree-felling to collect seeds for use in revegetation.
- Excavated soil would be separated into topsoil and subsoil components and replaced in its original order during backfilling to facilitate regeneration and revegetation activities.
- Retained trees would be monitored during vegetation rehabilitation and any signs of poor health reported to HCC and the site arborist in order to determine an appropriate course of action.

• All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

6.2 Fauna

The mitigation measure described in **Section 6.1** above for the protection of native flora would also assist in the protection of habitat for fauna species.

Additional mitigation measures would include:

- An ecologist would be present during the removal of any large woody debris in order to relocate any native fauna using this habitat to retained strands of SGTF. If any additional threatened species are discovered works would cease immediately. Advice would be sought from the Hawkesbury City Council ecologist and appropriate measures would be implemented to protect or relocate individuals of these species prior to the resumption of works. The discovery would also be reported to the DECC.
- Fallen logs would be relocated from earthworks areas to adjacent patches of SGTF under the supervision of an ecologist.
- All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

7.0 References

DECC 2008 *Threatened species, populations and ecological communities of NSW – Species Profiles.* Threatened species Website <u>http://www.threatenedspecies.environment.nsw.gov.au/index.aspx</u> NSW Department of Environment and Climate Change.

Harden 2007 Flora of New South Wales (Volumes 1-4). University of New South Wales Press.

Lands 2006 *East Coast Aerial Photos (Med-High resolution)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

Lands 2007 *Topographic maps (Current Series)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

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NPWS 2002 Native Vegetation of the Cumberland Plain, Western Sydney NSW National Parks & Wildlife Service – 1:25 000 Map Series

Appendix A Flora and Fauna Inventories

Appendix A Flora and Fauna Inventories

Table 1 Fau	na species rec	orded during survey
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Common Name	Scientific Name	Status			
Birds					
Australian Magpie	Gymnorhina tibicen	Protected			
Brown Goshawk	Accipiter fasciatus	Protected			
Brown Thornbill	Acanthiza pusilla	Protected			
Common Bronzewing	Phaps chalcoptera	Protected			
Eastern Spinebill	Acanthorhynchus tenuirostris	Protected			
Grey Fantail	Rhipidura fuliginosa	Protected			
Jack Winter	Microeca leucophea	Protected			
Laughing Kookaburra	Dacelo novaeguineae	Protected			
Magpie Lark	Grallina cyanoleuca	Protected			
Noisy Friarbird	Philemon corniculatus	Protected			
Noisy Miner	Manorina melanocephala	Protected			
Pied Currawong	Strepera graculina	Protected			
Rainbow Lorikeet	Trichoglossus haematodus	Protected			
Silvereye	Zosterops lateralis	Protected			
Spotted Pardalote	Pardalotus punctatus	Protected			
Superb Fairy Wren	Malurus cyaneus	Protected			
White-cheeked (Eastern) Rosella	Platycercus eximius	Protected			
Willie Wagtail	Rhipidura leucophrys	Protected			
Yellow Thornbill	Acanthiza nana	Protected			
Reptiles					
Dark-flecked Garden Sunskink	Lampropholis delicata	Protected			
Eastern Water-skink	Eulamprus quoyii	Protected			
Common Bearded Dragon	Pogona barbata	Protected			
Frogs					
Eastern Dwarf Tree Frog	Litoria fallax	Protected			
Invertebrates	Invertebrates				
Cumberland Land Snail	Meridolum corneovirens	Endangered			

Table 2 Flora species recorded during survey

Scientific name	Status
Acacia parramattensis	Native
Acacia pubescens	Vulnerable (EPBC Act, TSC Act)
Alternanthera denticulata	Native
Araujia sericifera	Weed
Aristida vagans	Native
Asparagus aethiopicus	Weed
Austrodanthonia tenuior	Native
Bidens pilosa	Weed
Brachycome multifida var. multifida	Native
Bursaria spinosa	Native
Cheilanthes sieberi subsp. sieberi	Native
Chloris virgata	Weed
Commelina cyanea	Native
Conyza sp.	Weed
Cylindropuntia sp.	Weed
Desmodium varians	Native
Dianella revoluta var. revoluta	Native

Scientific name	Status
Dichondra repens	Native
Dillwynia sieberi	Native
Dillwynia tebuifolia	Vulnerable (EPBC Act, TSC Act)
Echinochloa crus-galli	Weed
Echinopogon ovatus	Native
Entolasia stricta	Native
Eragrostic curvula	Weed
Eremophila debilis	Weed
Eriochloa pseudoacrotricha	Native
Eucalyptus fibrosa	Native
Eucalyptus moluccana	Native
Eucalyptus tereticornis	Native
Euchiton sphaericus	Native
Glycine clandestina	Native
Goodenia hederacea subsp. hederacea	Native
Grevillea robusta	Weed
Hardenbergia violacea	Native
Ipomoea purpurea	Weed
Juncus usitatus	Native
Lepidosperma laterale	Native
Ligustrum lucidum	Weed
Lomandra multiflora subsp. multiflora	Native
Melaleuca decora	Native
Melia azedarach	Native
Microlaena stipoides var. stipoides	Native
Oplismenus aemulus	Native
Opercularia diphylla	Native
Oxalis perennans	Native
Panicum simile	Native
Parsonsia straminea	Native
Paspalum urvillei	Weed
Pennisetum clandestinum	Weed
Phragmites australis	Weed
Pomax umbellata	Native
Poranthera microphylla	Native
Pratia purpurascens	Native
Ricinus communis	Weed
Rubus fruticosus	Weed
Sida rhombifolia	Weed
Solanum americanum	Weed
Solanum mauritianum	Weed
Solanum nigrum	Weed
Tagetes minuta	Weed
Themeda australis	Native
Tricoryne elatior	Native
Typha orientalis	Native
Verbascum virgatum	Weed
Verbena bonariensis	Weed
Vernonia cinerea var. cinerea	Native
Wahlenbergia gracilis	Native

Appendix B Site Photographs

Appendix B Site Photographs

Photograph 1 – Acacia pubescens in unformed section of Bootles Lane





Photograph 2 – Disturbed vegetation near pump station location.



Photograph 3 – Relatively intact CPW near pump station location.







Photograph 4 – Mature trees containing hollows near pump station location

Appendix C TSC Act & EPBC Act Threatened Species Assessments

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1.0 TSC Act Threatened Species Impact Assessment

1.1 Seven-part test – Downy Wattle Acacia pubescens

Acacia pubescens is a spreading shrub, 1 - 4 m high with brilliant yellow flowers, bipinnate leaves (divided twice pinnately) and conspicuously hairy branchlets (DEC, 2005).

The distribution of *Acacia pubescens* is concentrated areas in Western Sydney including one in the Pitt Town area DEC (2005).

This species occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone DEC (2005).

It occurs in open woodland and forest, in a variety of plant communities including Cumberland Plain Woodland DEC (2005).

a) in the case of a threatened species, whether the action proposed 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 longevity of the species is unknown, but clonal species have been known to survive for many decades. Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod production and seed fall for this species appears to be low DEC (2005). The proposed activity would not result in significant damage to or removal of mature specimens of *A. pubescens* and hence is unlikely to limit their ability to reproduce vegetatively.

Flowering occurs from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December DEC (2005). As the proposed activity is not likely to have significant long term negative impacts on populations of potential pollinators or limit their movements, it is unlikely to alter the genetic transfer within the local population as a result of cross-fertilisation.

Acacia species generally have high seed dormancy and long-lived persistent soil seedbanks. It is thought that the species needs a minimum fire free period of 5 - 7 years to allow an adequate seedbank to develop DEC (2005). The proposed activity is not likely to affect fire regimes in the locality and hence would not impact significantly on the formation of a seedbank. Soil disturbance as a result of the action may cause soil-stored seeds of this species to germinate. As the duration of the proposed action would be brief, it is unlikely that seedlings would germinate and be damaged during earthworks.

The impact of the proposed action is hence not likely to place the local population of this species at risk of extinction.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

- d) 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 action proposed, and

Damage to a small amount (<0.36Ha) of native groundcover and under-storey vegetation which is habitat for *A. pubescens* would occur. Much of the area that would be impacted upon is currently dominated by weed species and would be revegetated with Cumberland Plain Woodland groundcover and understorey species thereby reducing the threat of weed invasion on remaining *A. pubescens* habitat.

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

The study area is fragmented from areas of contiguous *A. pubescens* habitat by several roads and cleared areas. There will be no further fragmentation as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

Given that:

- The percentage of *A. pubescens* habitat that could be affected is a small proportion of the total remaining in the study area and broader locality and;
- Mitigation measures would be implemented to prevent damage to specimens of *A. pubescens* and the species' habitat and;
- Regeneration and revegetation would enhance retained A. pubescens habitat,
- it is considered that unlikely that the proposed activity would have significant negative impact on the long-term survival of the species in the locality.
- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The habitat found in the study area is not listed as critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has been approved for *A. pubescens* (NPWS, 2003). The proposed action is consistent with the objectives of the recovery plan. Specific objectives that the proposed action will help to achieve are:

- to ensure that a representative sample of *A. pubescens* populations occurring on public and private lands are protected from habitat loss and managed for conservation;
- to reduce the impacts of threats at sites across the species' range;

Bushland regeneration and revegetation of *A. pubescens* habitat adjacent degraded areas will help to conserve the species and reduce the impact of threatening processes such as the invasion of exotic perennial grasses.

The proposed action is not inconsistent with the other objectives listed in the recovery plan. There are no threat abatement plans which apply to this species.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Several threatening processes may affect A. pubescens:

Clearing of native vegetation is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006)

and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Some native vegetation would be cleared for the proposed action. Substantial rehabilitation of vegetation adjacent to the site will occur once construction activities have finished and this will result in enhancement to the condition of retained vegetation in the study area.

Invasion of native plant communities by exotic perennial grasses is a key threatening process (KTP) which is affecting the *A. pubescens* habitat of the study site. The impact of this KTP on the *A. pubescens* could be exacerbated as a result of the proposal. The mitigation measures described should, however prevent and even reduce the existing impact of this process on *A. pubescens*.

Competition and grazing by the feral European rabbit may also be affecting this population of *A. pubescens*. The proposed action is unlikely exacerbate this process and may help to mitigate its impact through the removal of dense blackberry cover and the enhancement of *A. pubescens* habitat.

The ecological consequences of high frequency fires KTP is unlikely to be affected by the proposed action as it would not result the ignition of fires or changes to the fire management regime of the study area.

The *infection of native plants by Phytophthora cinnamomi* KTP could be potentially be exacerbated by the proposed action but this outcome is unlikely as mitigation measures would be implemented to prevent the transmission of this soil-borne pathogen during earthworks.

Conclusion

Based on the above investigation, we consider there is no need for a Species Impact Statement to be conducted on the impacts of the proposed action on *A. pubescens*.

References

- DEC (2003). Acacia pubescens R. Br. Approved Recovery Plan. Department of Environment and Conservation, Hurstville, Sydney.
- DEC (2007). Department of Environment and Conservation National Parks and Wildlife website http://www.nationalparks.nsw.gov.au/. Accessed 18 September 2006.
- Fairley, A. & Moore, P. (1989). *Native Plants of the Sydney District An Identification Guide.* Kangaroo Press, Kenthurst.
- NPWS (2003). Threatened Species Information Sheet *Acacia pubescens*. NSW National Parks and Wildlife Service, Hurstville, Sydney.
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1.2 Seven-part test – Cumberland Land Snail Meridolum corneovirens

Meridolum corneovirens is an endangered species according to the TSC Act. It is a large, native snail species which typically has a shell diameter of 15-30 mm and is tan to dark brown with a green or yellow tinge (NPWS, 2000).

Meridolum corneovirens is restricted to the Cumberland Plain region of western Sydney – a region that has been largely cleared of native vegetation. Although *Meridolum corneovirens* is known from over 100 locations, these populations are small, scattered and isolated (NPWS, 2000).

Populations have been identified within three kilometres of the study area (Figure 1) and the species was detected between Old Pitt Town Road and Hortons Creek.



Figure 1 - Location of species recordings in the vicinity of the study area and proposed action.

Very little is known about the biology and life history of *Meridolum corneovirens*. It is hermaphroditic and lays clutches of 20-25 small, round white eggs in moist, dark areas and these eggs take 2-3 weeks to hatch (NPWS, 2000). *Meridolum corneovirens* is a nocturnal fungivore (NPWS, 2000) that will not eat plant matter at all (Australian Museum, 2006). Populations of *Meridolum corneovirens* are highly structured at very short distances (two metres) and the genetic neighbourhood – an indication of the distances moved by individuals between birth and breeding – is only 350 metres (Clark & Richardson, 2002).

Threats to *Meridolum corneovirens* arise from clearing and habitat modification, such as weed invasion, inappropriate fire management and removal of ground cover (NPWS, 2000). *Meridolum corneovirens* have been recorded at several sites within three kilometres of the study area since 1990 (NPWS, 2000). Surveys during wet periods are more likely to reveal the presence of this species (Australian Museum, 2006).

a) in the case of a threatened species, whether the action proposed 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,

Little is known about the life cycle of *Meridolum corneovirens*. The species has very limited dispersal ability and hence interaction between populations is believed to be minimal. Eggs are laid in moist situations, often under logs and other debris. No fragmentation of potential habitat would occur as result of the proposal.

No disturbance of vegetation, leaf-litter or woody debris would occur within the patch of woodland in the study area that is known habitat for the species. Woody debris in areas that require clearing would be relocated to retained vegetation such that it remains available to the species post-construction, should it occur in these areas.

The proposed action is not considered likely affect the lifecycle of a viable local population of this species such that it is placed at a significantly increased risk of extinction.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

d) in relation to the habitat of a threatened species, population or ecological community:

Meridolum corneovirens is restricted to the woodlands of the Cumberland Plain in Western Sydney, where it typically occurs under logs and other debris, amongst leaf and bark accumulations around the bases of trees, and sometimes under grass clumps (NPWS, 2000). It will burrow into loose soil wherever possible (NPWS, 2000).

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The approximately 0.36 hectares of moderately disturbed SCFF vegetation that would be removed or disturbed comprises a small proportion of the remaining potential habitat for the species in the study area. Targeted searches did not detect the species in the woodland that would be removed. The area in which the species was detected would be avoided in order to minimize disturbance to potential habitat of this species.

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

The study area is fragmented from areas contiguous vegetation by several roads and cleared areas. There will be no further fragmentation as a result of the proposal. Given the small range that individual *Meridolum corneovirens* inhabit and their limited dispersal ability, minimal genetic exchange between separate populations in the locality is expected.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

The small amount of vegetation to be removed is unlikely to be of importance to the long-term survival of a population of *Meridolum corneovirens* in the locality. The regeneration and revegetation of SGTF

in the vicinity of the pump station would likely result in an increase in higher quality habitat for the species in the medium to long term.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The habitat found in the study area is not listed as critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Cumberland Land Snail. There are no threat abatement plans of relevance to the Cumberland Land Snail.

The following priority actions have been identified by DECC as having relevance to the species:

- Approach priority private site landholders to negotiate implementing protective management regimes. (Low priority)
- Ensure public land plans of management include appropriate actions for species' protection. (Medium priority)
- Identify priority sites for conservation actions on private land. (Low priority)
- Implement appropriate fire regimes (ones that allow build up of grass and litter layers). (Medium priority)
- Implement weed control at sites where necessary. (Medium priority)
- Install structures (where necessary) to prevent accidental slashing and removal of plant debris. (Medium priority)
- Investigate population census techniques and responses to environmental conditions, with the aim of developing estimates of true population size based on numbers detected in standard surveys. (Low priority)
- Reserve Fire Management Strategy to include operational guidelines to protect this species from fire. . (Medium priority)
- Review species' conservation status with consideration of data obtained since listing as endangered. (Low priority)

The construction methodology and mitigation measures proposed are consistent with these actions in that they would minimize the extent of habitat disturbance and include measures to protect habitat including weed control, relocation of woody debris and exclusion fencing.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Clearing of native vegetation - is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006) and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Some clearing of SGTF could occur. The vegetation clearance proposed is not considered likely to significantly impact the biodiversity of the study area. Highly disturbed vegetation adjacent to the pump station locality would be rehabilitated once construction activities have finished which would result in an improvement to the condition of this, the largest and most intact remnant.

Conclusion

Meridolum corneovirens is an endangered species known to occur in at least one location within the study area. Due to the degraded nature of the area that will be impacted upon by the proposal and
the proposed mitigation measures no significant impact is on this species is considered likely to occur due to the proposal.

References

Australian Museum (2006). Meridolum corneovirens (Pfeiffer, 1851) (Family Camaenidae). http://www.amonline.net.au/invertebrates/mal/endangered/meridolum.htm

BioNet (2006). BioNet Website http://www.bionet.nsw.gov.au/ NSW Government.

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- DEC (2006). Department of Environment and Conservation National Parks and Wildlife website http://www.nationalparks.nsw.gov.au/. Accessed 18 September 2006.
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1.3 Seven-part test – Shale Gravel Transition Forest

Shale Gravel Transition Forest (SGTF) is listed as an Endangered Ecological Community under the *Threatened Species Conservation Act 1995*. This community is not listed under the *Environmental Protection Biodiversity Conservation Act 1999*. Shale Gravel Transition Forest is typically dominated by one or more of the following: Broad-leaved Ironbark *Eucalyptus fibrosa* with Grey Box, *Eucalyptus moluccana*, and Forest Red Gum *Eucalyptus tereticornis* occurring less frequently. The understorey is dominated by Blackthorn *Bursaria spinosa, Daviesia ulicifolia*, and Peach Heath *Lissanthe strigosa* (DEC 2005). This community has been identified in several parts of the study area.

a) in the case of a threatened species, whether the action proposed 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,

Not applicable.

Figure 1 – Approximate extent of SGTF in study area.



b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (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

The following impacts to Shale Gravel Transition Forest would occur as a result of the proposed development:

Approximately 0.36ha of SGTF of poor to moderate condition would be removed

Damage may occur to the root systems of canopy species as a result of earthworks.

It is not considered that a significant area of Shale Gravel Transition Forest will be impacted such that its local occurrence is likely to be placed at risk of extinction or that impacts are likely to substantially and adversely modify the composition of the ecological community due to the extent of clearing and the mitigation and offset measures that would be implemented.

(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,

The retained patches of SGTF vary in condition from highly to moderately disturbed condition.

The proposal is unlikely to modify the composition of the retained areas of the ecological community such that its local occurrence is likely to be placed at risk of extinction. Proposed regeneration activities are likely to improve the long-term viability of the large remnant of SGTF adjacent to the pump station.

These management controls and compensatory actions will reduce the impact of the proposed activity and significantly improve the quality of retained vegetation within the study area.

- d) 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 action proposed, and

The following impacts to SGTF habitat could potentially occur as a result of the substation development:

- Approximately 0.35ha of highly and moderately disturbed SGTF would be removed or disturbed for the installation of the sewerage main. This area would be revegetated with SGTF species post-construction.
- Approximately 0.01ha of highly disturbed SGTF would be lost for the construction of the pump station. Adjacent exotic vegetation would be removed and replaced with SGTF species.
 - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The study area is fragmented from areas of contiguous vegetation by several roads and cleared areas. There will be minimal further fragmentation as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

Given that:

- The percentage SGTF that could be affected is less a small proportion of the total remaining SGTF in the study area and;
- Mitigation measures would be implemented to prevent excess damage to SGTF and;
- Regeneration and revegetation would be conducted in rertained SGTF and adjacent exotic vegetation,

It is considered that the proposed activity would not have a significant negative impact on the long-term survival of the ecological community in the locality.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The study area does not contain critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan entitled *Recovery planning for the Cumberland Plain's endangered ecological communities* is currently in preparation. As such, the objectives and actions of this plan are yet to be finalised and are not considered here in detail. It is however, considered likely that the proposed action would be broadly consistent with the objectives of this plan.

There are no threat abatement plans which apply to this EEC.

The following priority actions have been identified by DECC for this EEC:

- Develop and implement Cumberland Plain Reservation Strategy and create a protected bushland network through targeted land acquisition as land becomes available. (High priority)
- Encourage and promote best-practice management of EECs on private land. (Medium priority)
- Encourage planning authorities to address EECs in development of environmental planning instruments and, where possible, seek biodiversity certification. (Medium priority)
- Ensure the consideration of impacts on EECs when enforcing noxious weed or pest species control in EECs. (Medium priority)
- Finalise the multi-EEC recovery plan as a State priority in accordance with contractual obligations with DEH, by July 2007. (Medium priority)
- Incorporate consideration of EEC protection in regional open space planning. (High priority)
- Investigate the development of a regular monitoring program to assess the change in extent of vegetation across the Cumberland Plain. (Medium priority)
- Investigate the preparation of a recommendation for the declaration of critical habitat. (Low priority)
- Liaise with institutions to facilitate research relevant to the recovery of Cumberland Plain EECs. (Low priority)
- Manage, to best practice standards, areas of EECs which have conservation as a primary objective, or where conservation is compatible. Priorities are to be based on DEC conservation significance assessment. (High priority)
- Management of EECs is to be included in school environmental management plans where the school land contains EECs. (Medium priority)
- Management of EECs to be included in the conditions for Crown land trusts, lease and licence holders. (Medium priority)
- Prepare and implement community awareness, education and involvement strategy. (Medium priority)
- Promote best practice management guidelines. (Medium priority)
- Public authorities will promote management agreements to landholders through their ongoing land use planning activities. (Medium priority)
- Support community conservation by providing nursery or other facilities, for regeneration activities. (Low priority)

The mitigation and rehabilitation measures which would be conducted as part of the proposed action would be consistent with these management principles.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Several threatening processes may affect SGTF.

Clearing of native vegetation is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006)

and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Clearing of native vegetation would be kept to the minimum required to construct the pump station and rising main.. Substantial rehabilitation of vegetation adjacent to the site will occur once construction activities have finished and this would result in an improvement to the retained SGTF in the patch adjacent to the pump station.

Invasion of native plant communities by exotic perennial grasses is listed as a key threatening process (KTP) which is affecting the SGTF of the study site. The impact of this KTP on the SGTF could be exacerbated as a result of the proposal. The mitigation measures described should, however prevent and even reduce the existing impact of this process on the remnant SGTF.

Competition and grazing by the feral European rabbit is also affecting this SGTF. The proposed action is unlikely exacerbate this process and may help to mitigate its impact through the removal of dense blackberry cover and the enhancement of groundcover and understorey species diversity and abundance.

The ecological consequences of high frequency fires KTP is unlikely to be affected by the proposed action as it would not result the ignition of fires or changes to the fire management regime of the study area.

The *infection of native plants by Phytophthora cinnamomi* KTP could be potentially be exacerbated by the proposed action but this outcome is unlikely as mitigation measures would be implemented to minimise the likelihood of transmission of this soil-borne pathogen during earthworks.

Conclusion

The Shale Gravel Transition Forest would be adversely affected by some aspects of the proposed action.

Due to the degraded nature of much of the area that will be impacted upon by the proposal and the proposed mitigation measures, no significant negative impact is on this EEC is considered likely to occur due to the proposed action.

Based on the above investigation, we consider that the impacts of the proposed action on Shale Gravel Transition Forest are not likely to be significant.

References

- DEC (2006). Department of Environment and Conservation National Parks and Wildlife website http://www.nationalparks.nsw.gov.au/.
- NHT (2006). New South Wales: Case Study Bushcare Projects Integrated Ecological Restoration of Western Sydney Corridors 'Greening Western Sydney'. National Heritage Trust website http://www.nht.gov.au/nht1/programs/bushcare/nswproj.html . Accessed 18 September 2006.
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- Vellend, M., Verheyen, K., Jacquemyn, H., Kolb, A., Van Calster, H., Peterken, G. & Hermy, M. (2006). Extinction debt of forest plants persists for more than a century following habitat fragmentation. Ecology 83: 542-548.

2.0 EPBC Act Threatened Species Assessment

2.1 Downy wattle - *Acacia pubescens*

Assessment against significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

· lead to a long-term decrease in the size of an important population of a species;

The proposal may result in a reduction of the population of the species in the study area. The individuals that would be affected however are isolated from other individuals and significant areas of habitat.

The population of *A. pubescens* within the larger woodland remnant adjacent to the pump station may be considered an important population but the proposed action is not considered likely to lead to a long term decrease in this population.

• reduce the area of occupancy of an important population;

The area currently occupied by this population would not be reduced by the proposed action.

• fragment an existing important population into two or more populations;

No fragmentation of important populations of the species would occur as a result of the proposal.

· adversely affect habitat critical to the survival of a species;

No habitat critical for the survival of the species is present in the study area.

• disrupt the breeding cycle of an important population;

No disruption to the breeding cycle of this species is expected to occur as a result of the proposed action. The individuals that may be directly affected are isolated from significant populations of the species and hence minimal genetic interaction is expected.

• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

The habitat affected by the proposed action is of low quality and is highly fragmented. The proposed action is not expected to affect higher quality areas of habitat for the species and hence is not expected to contribute significantly to the decline of the species in the locality.

• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;

Invasive weed species are already present in the habitat of this species. The mitigation measures that would be implemented as part of the proposed action would ensure that the likelihood of the establishment of additional weed species and the spread of existing species would be low.

• introduce disease that may cause the species to decline;

Earthworks required for the project have the potential to introduce pathogens such as Phytophthora root-rot fungus. It is a requirement that construction equipment is clear of mud of mud and other debris before entering the construction site. With this measure in place the likelihood of introducing plant pathogens to the site is considered to be low.

• interfere substantially with the recovery of the species.

Construction of the pump station would reduce the area available for *A. pubescens* to spread from the adjacent woodland vegetation through the removal of some highly disturbed vegetation. Weed control and revegetation would however improve the condition of the remaining disturbed vegetation such that the ability of the species to establish here would be increased in the long-term.

2.2 Dillwynia tenuifolia

Assessment against significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

lead to a long-term decrease in the size of an important population of a species;

The proposal is unlikely to result in a reduction of the population of the species in the study area as the proposed construction methodology would avoid direct impacts on this species.

The population of *D. tenuifolia* may be considered an important population but the proposed action is not considered likely to lead to a long term decrease in this population.

reduce the area of occupancy of an important population;

The area currently occupied by this population would not be reduced by the proposed action.

• fragment an existing important population into two or more populations;

No fragmentation of important populations of the species would occur as a result of the proposal.

adversely affect habitat critical to the survival of a species;

No habitat critical for the survival of the species is present in the study area.

disrupt the breeding cycle of an important population;

No disruption to the breeding cycle of this species is expected to occur as a result of the proposed action.

• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

The habitat which may be indirectly affected by the proposed action is of low quality and is highly fragmented. The proposed action is not expected to affect habitat for the species and hence is not expected to contribute significantly to the decline of the species in the locality.

• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;

Invasive weed species are already present in the habitat of this species. The mitigation measures that would be implemented as part of the proposed action would ensure that the likelihood of the establishment of additional weed species and the spread of existing species would be low.

• introduce disease that may cause the species to decline;

Earthworks required for the project have the potential to introduce pathogens such as Phytophthora root-rot fungus. It is a requirement that construction equipment is clear of mud of mud and other debris before entering the construction site. With this measure in place the likelihood of introducing plant pathogens to the site is considered to be low.

• interfere substantially with the recovery of the species.

No interference with the recovery of the species is likely to occur as result of the proposed action. No significant change in the population of the species or its habitat is likely and hence the contribution of this population to the recovery of the species would not be altered.

Conclusion

No significant impacts on EPBC Act listed species are likely to occur as a result of the proposed activity. Referral of the proposed development to DEWHA for approval on the basis of potential impacts on flora and fauna is not considered necessary.

Appendix D Threatened Species Habitat Assessment

Appendix D Threatened Species Habitat Assessment

Table 1 Threatened flora species recorded or considered likely to occur in vicinity and likelihood of occurrence on the study site.

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Acacia bynoeana	Vulnerable (EPBC)	Occurs in heath or dry sclerophyll forest on sandy soils.	Very Low	EPBC, TSC
Bynoe's Wattle	Endangered (TSC)			
Acacia gordonii	Endangered	Grows in dry sclerophyll forest and heathlands amongst or within rock platforms on sandstone outcrops.	Very Low	EPBC, TSC
Acacia pubescens Downy Wattle	Vulnerable	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone.	High Recorded on site	EPBC, TSC
Allocasuarina glareicola	Endangered	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Low to Moderate	TSC
Ancistrachne maidenii	Vulnerable	Habitat requirements appear to be specific, with populations occurring in distinct bands in areas associated with a transitional geology between Hawkesbury and Watagan soil landscapes	Very Low	TSC
<i>Cryptostylis hunteriana</i> Leafless Tongue- orchid	Vulnerable	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis).	Low	EPBC, TSC
Darwinia biflora	Vulnerable	Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Very Low	EPBC, TSC
Dillwynia tenuifolia	Vulnerable	In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland	High Recorded on site	EPBC, TSC
Hibbertia superans	Endangered	The species occurs on sandstone ridgetops often near the shale/sandstone boundary.	Very Low	TSC

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Epacris purpurascens var. purpurascens	Vulnerable	Found in a range of habitat types, most of which have a strong shale soil influence.	Moderate to Low	TSC
Eucalyptus sp. Cattai	Endangered	Occurs in scrub, heath and low woodland on sandy soils, sites being generally flat and on ridge tops	Very Low	TSC
Grevillea juniperina subsp. juniperina Juniper-leaved Grevillea	Vulnerable	Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels.	High	TSC
Grevillea parviflora subsp. supplicans	Endangered	Occurs in heathy woodland associations on skeletal sandy soils over massive sandstones	Very Low	TSC
Kunzea rupestris	Vulnerable (EPBC) Endangered	Grows in shallow depressions on large flat sandstone rock outcrops.	Very Low	EPBC, TSC
Leucopogon fletcheri subsp. fletcheri	(TSC) Endangered	Occurs in dry eucalypt woodland or in shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs.	Moderate	TSC
Melaleuca deanei	Vulnerable	The species grows in heath on sandstone.	Very Low	EPBC, TSC
Deane's Melaleuca		Typically occurs within heathlands in		
Micromyrtus blakelyl	Vuinerable	shallow sandy soil in cracks and depressions of sandstone rock platforms.	very Low	EPBC, ISC
Micromyrtus minutiflora	Vulnerable (EPBC) Endangered (TSC)	Grows in Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	Moderate to Low	EPBC, TSC
Olearia cordata	Vulnerable	Grows in dry open sclerophyll forest and open shrubland, on sandstone ridges.	Very Low	EPBC, TSC
Persoonia hirsuta	Endangered	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Very Low	EPBC, TSC
Persoonia nutans	Endangered	Confined to aeolian and alluvial sediments and occurs in a range of sclerophyll forest and woodland vegetation communities.	Very Low	EPBC, TSC
Pimelea curviflora var. curviflora	Vulnerable	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands.	Very Low	EPBC, TSC
Pimelea spicata Spiked Rice-flower	Endangered	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. It is associated with Grey Boy and Ironbark	Moderate to High	EPBC, TSC
Pomaderris brunnea	Vulnerable	Brown Pomaderris grows in moist woodland or forest on clay and alluvial	Moderate	EPBC
Brown Pomaderris		solis of flood plains and creek lines		

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Pterostylis saxicola	Endangered	Most commonly found growing in small pockets of shallow soil in depressions on sandstope rock shelves above cliff	Very Low	EPBC
Sydney Plains		lines.		
Greenhood				
Pultenaea parviflora	Vulnerable (EPBC) Endangered (TSC)	May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays.	Moderate to High	EPBC, TSC
Tetratheca glandulosa	Vulnerable	Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone.	Very Low	EPBC, TSC
Zieria involucrata	Endangered	Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium.	Very Low	TSC
Reference: Habitat requi	rements extracte	d from DECC threatened species profiles.		

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
<i>Botaurus poiciloptilus</i> Australasian Bittern	Vulnerable	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleoacharis spp.).	Very Low	TSC
Burhinus grallarius	Endangered	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	Moderate	TSC
Bush Stone-curlew				
<i>Cacatua leadbeateri</i> Major Mitchell's Cockatoo	Vulnerable	Inhabits a wide range of freed and treeless inland habitats, always within easy reach of water.	Low	TSC
Callocephalon fimbriatum Gang-gang Cockatoo	Vulnerable	In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	High	TSC
Calyptorhynchus Iathami Glossy Black- Cockatoo	Vulnerable	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur.	Moderate	TSC
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat, Large Pied Bat	Vulnerable	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle- shaped mud nests of the Fairy Martin (Hirundo ariel), frequenting low to mid- elevation dry open forest and woodland close to these features.	Moderate to High	EPBC, TSC
Climacteris picumnus Brown Treecreeper	Vulnerable	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	High to Moderate	TSC
Dasyurus maculatus Spot-tailed Quoll	Endangered (EPBC – SE mainland) Vulnerable (TSC)	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub- alpine zone to the coastline.	Moderate to Low	EPBC, TSC
Ephippiorhynchus asiaticus Black-necked Stork	Endangered	Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands	Very Low	TSC

Table 2 Threatened fauna species recorded or considered likely to occur in vicinity and likelihood of occurrence in the study area.

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Falsistrellus tasmaniensis	Vulnerable	Prefers moist habitats, with trees taller than 20 m.	High to Moderate	TSC
Eastern False Pipistrelle		Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.		
Grantiella picta	Vulnerable	Inhabits Boree, Brigalow and Box- Gum Woodlands and Box-Ironbark Forests	Low to Moderate	TSC
Painted Honeyeater	Vulnerable	Found in heath woodland and open	Low	FPBC TSC
australiacus	v uniciable	forest with sandy soils		21 20, 100
Giant Burrowing Frog) (. la sus h la	Sholtors in rock crovices and under		
Hoplocephalus bungaroides Broad-headed Snake	(EPBC, TSC Act)	flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Very Low	EPBC, TSC
		Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer.		
Irediparra gallinacea	Vulnerable	Inhabits permanent wetlands with a good surface cover of floating vegetation, especially water-lilies.	Very Low	TSC
Comb-crested Jacana	Endonconod	They are generally only found in heath	1.000	
obesulus	Endangered	or open forest with a heathy understorey on sandy or friable soils.	LOW	EPBC, ISC
Southern Brown Bandicoot				
Ixobrychus flavicollis	Vulnerable	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense	Very Low	TSC
Black Bittern		vegetation.		
Lathamus discolor	Endangered	On the mainland they occur in areas where eucalypts are flowering	High to Moderate	EPBC, TSC
Swift Parrot		profusely or where there are abundant		
		infestations. Commonly used lerp		
		infested trees include Grey Box E.		
		microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis.		
Limosa limosa	Vulnerable	Primarily a coastal species.	Very Low	EPBC, TSC
Black-tailed Godwit		Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats		
Litoria aurea	Vulnerable	Inhabits marshes, dams and stream-	Low-Moderate	EPBC, TSC
Green and Golden Bell Frog	(EPBC)	sides, particularly those containing bullrushes		
	Endangered (TSC)			
Litoria littlejohni	Vulnerable	It occurs along permanent rocky streams with thick fringing vegetation	Very Low	EPBC, TSC
Littlejohn's Tree Frog		associated with eucalypt woodlands and heaths among sandstone outcrops.		

Species Name	Status	Habitat Requirements / Comment	Likelihood of	Database /
			Occurrence	Act
Lophoictinia isura	Vulnerable	Found in a variety of timbered habitats	High to	TSC
		Including dry woodlands and open forests. Shows a particular preference	Moderate	
Square-tailed Kite		for timbered watercourses		
Melithreptus gularis	Vulnerable	Occupies mostly upper levels of drier	High	TSC
gularis		open forests or woodlands dominated		
		especially Mugga Ironbark		
Black-chinned		(Eucalyptus sideroxylon), White Box		
Honeyeater (eastern		(Eucalyptus albens), Grey Box		
subspecies)		(Eucalyptus microcarpa), renow Box		
		Red Gum (Eucalyptus tereticornis).		
Meridolum	Endangered	Primarily inhabits Cumberland Plain	High	TSC
corneovirens		community). This community is a		
		grassy, open woodland with		
Cumberland Plain		occasional dense patches of shrubs.		
Land Shall	Vulnorabla	Caves are the primary roosting	High to	790
schreibersii	vuillelable	habitat, but also use derelict mines,	Moderate	130
oceanensis		storm-water tunnels, buildings and	Moderate	
		other man-made structures. Hunt in		
Eastern Bentwing-bat		other flying insects above the tree		
		tops.		
Mixophyes balbus	Vulnerable	Found in rainforest and wet, tall open	Very Low	EPBC, TSC
		on the eastern side of the Great		
Stuttering Frog		Dividing Range.		
Mixophyes iteratus	Endangered	Giant Barred Frogs forage and live	Very Low	EPBC, TSC
		rainforests, moist eucalypt forest and		
Giant Barred Frog		nearby dry eucalypt forest		
Mormopterus	Vulnerable	Occur in dry sclerophyll forest and	High	TSC
norfolkensis		Range.		
Eastern Freetail-bat		Roost mainly in tree hollows but will		
		also roost under bark or in man-made		
Myotis adversus	Vulnerable	Generally roost in groups of 10 - 15	Moderate	TSC
myous advorsus	Vullerable	close to water in caves, mine shafts,	Woderate	100
Large-footed Myotis		hollow-bearing trees, storm water		
		in dense foliage.		
		Forage over streams and pools		
		catching insects and small fish by		
		surface.		
Neophema pulchella	Vulnerable	Lives on the edges of eucalypt	Moderate	TSC
		woodland adjoining clearings,		
Turquoise Parrot		farmland		
Ninox connivens	Vulnerable	Inhabits eucalypt woodland, open	Moderate to	TSC
		forest, swamp woodlands and,	High	
Barking Owl		especially in inland areas, timber		
-		vegetation is used occasionally for		
		roosting.		
Ninox strenua	Vulnerable	I he Powerful Owl inhabits a range of	High	TSC
		open sclerophyll forest to tall open wet		

Species Name	Status	Habitat Requirements / Comment	Likelihood of	Database /
			Occurrence	Act
Powerful Owl		forest and rainforest.		
Oxyura australis Blue-billed Duck	Vulnerable	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic	Very Low	TSC
Potourus australis	Vulnerable	Occur in tall mature eucalypt forest	Moderate to	TSC
Yellow-bellied Glider	Vullerable	generally in areas with high rainfall and nutrient rich soils.	High	100
Petaurus norfolcensis	Vulnerable	Inhabits mature or old growth Box,	Moderate to	TSC
Squirrel Glider		Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt- Bloodwood forest with heath understorey in coastal areas.	Low	
		Prefers mixed species stands with a shrub or Acacia midstorey.		
Petrogale penicillata	Vulnerable	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures.	Very Low	EPBC, TSC
Brush-tailed Rock- wallaby		caves and ledges facing north.		
Phascolarctos	Vulnerable	Inhabit eucalypt woodlands and	Moderate to	TSC
cinereus		torests.	High	
Koala		Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.		
Polytelis swainsonii Superb Parrot	Vulnerable	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Moderate to Low	TSC
Potorous tridactylus tridactylus Long-nosed Potoroo	Vulnerable (EPBC Act - SE mainland)	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Low	EPBC, TSC
Pseudophryne australis	Vulnerable	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones.	Very Low	TSC
Red-crowned Toadlet		Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings		
Pteropus poliocephalus Grey-headed Flying- fox	Vulnerable	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	High	EPBC, TSC
		Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.		
Pyrrholaemus	Vulnerable	The Speckled Warbler lives in a wide range of Eucalyptus dominated	High	TSC

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
sagittatus Speckled Warbler		communities that have a grassy understorey, often on rocky ridges or in gullies		
Rostratula (benghalensis) australis (Australian) Painted	Vulnerable (EPBC) Endangered (TSC)	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber	Very Low	EPBC, TSC
Snipe Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	Vulnerable	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Moderate	TSC
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	Vulnerable	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings.	High to Moderate	TSC
Stictonetta naevosa Freckled Duck	Vulnerable	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds	Very Low	TSC
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides.	Moderate to High	TSC
<i>Tyto tenebricosa</i> Sooty Owl	Vulnerable	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	Moderate	TSC
Xanthomyza phrygia Regent Honeyeater	Endangered	The species inhabits dry open forest and woodland, particularly Box- Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of	High to Moderate	EPBC, TSC
Reference: Habitat requi	I irements extracted	from DECC threatened species profiles	I	I

F13 APPENDIX E: SEPP 1 OBJECTION

Bona Vista Properties Pty Ltd

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SEPP 1 Objection

Pursuant to State Environmental Planning Policy 1 – Development Standards

Subdivision for the Purpose of a Water Recycling Facility

Lot 1062, DP 1131838 - Bootles Lane, Pitt Town

Prepared by Bona Vista Properties Pty Ltd

Date: February 2010

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1 Standard to which Objection is Made

This objection is made in relation to a development standard contained within Clause 11 of Hawkesbury Local Environmental Plan 1989. Clause 11 provides for a minimum lot size of 10 hectares in the Environmental Protection – Agriculture Protection zone.

The parent lot, Lot 1062 DP 1131838, is already an undersized parcel of 8.256ha. The proposed subdivision of this parent lot seeks to establish proposed Lot 1068 (of 3,125sqm for the purpose of a Water Recycling Facility as defined in *State Environmental Planning Policy (Infrastructure) 2007)* and proposed Lot 1067 (being the residue – 7.943ha). There will be no reason for a dwelling entitlement on the Water Recycling Facility allotment (proposed Lot 1068).

The minimum lot size of 10ha, as required by Clause 11, can not therefore be achieved.

A draft Plan of Subdivision of this proposal is included in *Annexure 1* of this SEPP 1 submission.

Therefore, an objection to the minimum lot size standard in Clause 11 of the Hawkesbury Local Environmental Plan 1989 is sought, pursuant to State Environmental Planning Policy – Development Standards.

2 Overview

This document forms part of a subdivision development application concerning Lot 1062, DP 1131838 which is located on the south-eastern corner of the Vermont Pitt Town "Bona Vista" precinct, at the intersection of Bootles Lane and Johnston Street, Pitt Town. This document should be read in conjunction with the supporting Statement of Environmental Effects relating to this subdivision proposal.

This document outlines an objection under State Environmental Planning Policy (Development Standards) to Clause 11 of the Hawkesbury Local Environmental Plan 1989 which states a 10ha minimum lot size for land zoned Environmental Protection – Agriculture Protection (Scenic) as shown hatched on the Hawkesbury Local Environmental Plan Map.

The following will indicate how development, with an objection to the above development standard, can be carried out in accordance with the Environmental Planning and Assessment Act 1979 and how the subdivision standard, in this instant, is considered to be unreasonable and unnecessary. This is in accordance with Clause 6 of the State Environmental Planning Policy (Development Standards).

3 Background

3.1 Planning of Vermont Pitt Town

On 12 October 2007, the Minister for Planning declared the Pitt Town Residential Precinct to be a Major Project and in December 2007, Johnson Property Group (JPG) lodged a Part 3A Concept Plan Application for the project. The Concept Plan Application was accompanied by a detailed Environmental Assessment dated December 2007 prepared by planning consultants Don Fox Planning.

On 10 July 2008, the Minister for Planning issued Determination 07_0140 granting Part 3A Concept Plan Approval for the Pitt Town Residential Precinct. In total, the approval created potential for 943 residential lots within the Vermont Pitt Town release area. For completeness, a copy of the Director General's Assessment Report is attached in

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Annexure 2, with a copy of the Part 3A approval and Concept Plan attached in *Annexure* 3.

The Minister for Planning also approved the rezoning of the Pitt Town Residential Precinct on 18 July 2008 to permit development as proposed in the Concept Plan. A copy of this rezoning gazettal is included in *Annexure 4*.

Whilst neither the rezoning nor the Part 3A Concept Plan applied to the land which is the subject of this subdivision proposal, we note that Condition B6 of the Part 3A Concept Plan requires, *"written evidence of arrangements being made with Sydney Water, or other approved supplier, for the provision of individual water supply and sewerage services to all lots within each stage, will be submitted to the Principal Certifying Authority prior to certification of the Subdivision Plan in respect of that stage".* Therefore, with respect to sewerage services, there is an obligation to ensure that infrastructure is in place to service the Vermont Pitt Town estate and this application forms part of ensuring this obligation is satisfied.

In relation to subdivision development applications, Council have already granted subdivision consent to the staged development of the Bona Vista precinct (246 residential lots) and the staged development of the Cleary Precinct (112 residential lots). The conditions of both subdivision consents outline the requirements for connecting proposed lots to sewer infrastructure. Again, this subdivision proposal is a necessary step in ensuring this obligation is satisfied.

3.2 The Sewerage System

Sewage disposal services for the existing village of Pitt Town is provided via a combination of a reticulated sewerage system for the majority of the village and on site disposal for the remaining lots.

The reticulated sewerage system is owned and operated by Council and consists of gravity mains carrying effluent from individual lots within the current village to a pump station (PS J) located in Wellesley Street, Pitt Town. The effluent is then pumped from PS J to the McGraths Hill Wastewater Treatment Plant via a rising main located generally along Pitt Town Road. Council have advised that the pumping station, rising main and McGraths Hill treatment works are all almost at capacity.

To provide reticulated sewerage services to the Vermont Pitt Town release area, Council (in consultation with Johnson Property Group) adopted a sewerage strategy in October 2008. This included the installation of a new pump station (Pump Station T) off Bootles Lane / Johnston Street and associated rising main.

The cost to provide the entire sewer infrastructure to satisfy Council (being the sewer service authority) was estimated at \$21.35 million. This cost is inequitable and prohibitive for the development of the Vermont Pitt Town release area and an alternative solution was sought by Johnson Property Group.

Recent legislative changes to the Water Industry Competition Act 2006 (WICA) were made in August 2008. In brief this legislation enables private entities to become a Water Authority with all the powers of any current Water/Sewer Authority. The legislation falls under the responsibility of the Minister for Water and is regulated through the Independent Pricing and Regulatory Tribunal (IPART). IPART has strict guidelines as to who can be granted a licence under the WICA legislation. However, once a licence is granted, residents who choose to connect to the private sewerage scheme will fall outside of Council's authority for sewer services.

In consultation with Council officers, Johnson Property Group developed a proposal to construct an independent Water Recycling Facility for Vermont Pitt Town under the guidelines of the WICA legislation. The Water Recycling Facility proposal treats sewage locally and produces high quality recycled water for non-potable uses within the

community. This local treatment and non-potable reticulation reduces infrastructure costs and improves the viability of Vermont Pitt Town.

Whilst Council plays no part in the determination of granting a WICA licence, Council has resolved in-principle support of this alternative scheme by way of resolution on 25 August 2009. A copy of the 25 August 2009 Council report is included in *Annexure 5* for completeness.

3.3 The Subdivision

Deferred development consent was granted by Hawkesbury City Council on 24 April 2007 (DA0557/06) for staged development of the Bona Vista precinct, including 224 residential lots with landscaping, new and upgraded roads. Development consent became operational on 26 July 2007. Recently, Council resolved to modify this consent to permit 246 residential lots, consistent with the Part 3A Approval for Pitt Town.

On 29 January 2009, the NSW Land Title Office registered Stage 1a of the Bona Vista Precinct, being the creation of super-lots to reflect each stage of this precinct, including the creation of a residue lot, known as Lot 106 DP 1123395. Lot 106 was 8.343ha in area and zoned Environmental Protection – Agriculture Protection (note: Lot 106 was approved and registered as an undersized lot in the Environmental Protection – Agriculture Protection zone).

Pursuant to the October 2008 Council adopted sewer strategy (mentioned in Section 2.2 of this submission), new Pump Station T has recently been erected on Lot 106. Pump Station T had to be transferred to become a Council asset and as such, required its own land title for transfer.

Council authorised the further subdivision of Lot 106, with the NSW Land Title Office recently registering DP 1131838 – creating Lot 1061 (approximately 861sqm – the Pump Station T lot) and a residue lot (Lot 1062) being the balance of the original 8.343ha.

This application proposes the further subdivision of the Lot 1062 residue parcel to create a lot for the purpose of a Water Recycling Facility (as defined in *State Environmental Planning Policy (Infrastructure) 2007*). Whilst Council approval is not required for the installation of the Water Recycling Facility, Council's approval is required to the subdivision of the land so that a Land Title can be transferred to a licensed authority under WICA 2006 legislation to install the Water Recycling Facility public utility.

We note that the proposed area (as shown on the attached draft plan of subdivision – *Annexure 1*) does not meet the minimum lot size requirements outlined in the Hawkesbury LEP for the Environmental Protection – Agriculture Protection zone. As outlined, the original parent lot (Lot 106, DP 1123395) was already an approved undersized parcel. The adjacent SPS T parcel has been recently subdivided from the parent lot on an 840sqm piece of land and although it did not meet the minimum lot size requirements it was created to support the undertaking of a public purpose (Council sewer assets). It is suggested that in order to service the Vermont Pitt Town Release Area in the manner proposed (ie via the WICA legislation) a subdivision and SEPP 1 approval is a necessary step to achieving that outcome.

4 Site Locality and Context

4.1 Location

The site is located to the north of Pitt Town, approximately 6 kilometres from Windsor. A general location of the site is depicted on **Figure 1**.



Figure 1: The site location

4.2 Site Description

The site of the proposed Water Recycling Facility is located within the Bona Vista Precinct at the intersection of Johnston Street and Bootles Lane, Pitt Town.

The site is generally rectangular in shape, with an approximate 52m frontage to Bootles Lane and 39m frontage to Johnston Street. The 3,125sqm site adjoins the southern and western sides of Lot 1061 DP 1131838, being the new Sewer Pump Station T site, as shown in **Figure 2**.

The site is sparsely vegetated, with very little understorey vegetation.

There are no other improvements on the subject land.



Figure 2: Draft Deposited Plan of Subdivision

5 Extent of Variation Sought and Context of Objection

The site which is the subject of this SEPP 1 submission is an approximately 8.3ha parcel of land known as Lot 1062 DP 1131838. This parent allotment was created following:

- the subdivision of Lot 14, DP 865977 and Lot 132, DP 1025876 to create 246 residential allotments and a residue lot (the subject land), which contains remnant vegetation, and
- a further (recent) subdivision to subdivide off a 840sqm piece of land for a Council Sewer Pump Station (known as Pump Station T) to the immediate north of the subject Water Recycling Facility site.

The failure of the proposed subdivision to comply with the minimum lot size of the Environmental Protection – Agriculture Protection (Scenic) zone is an anomaly that has emerged due to the retention of the existing zoning over this portion of the Pitt Town Development Area, on a site that is already undersized for this zone.

This subdivision proposal is considered to be consistent with the aims and objectives of the Hawkesbury LEP, in particular:

- It is our understanding that the land is not prime crop and pasture land and it is unlikely that any profitable agricultural pursuits will occur. The land maintained its Environmental Protection – Agriculture Protection zoning more to protect tree vegetation and rural scenic quality than to provide for agricultural activities. This proposal provides mitigation measures to minimise vegetation loss and enhance scenic quality within the rural setting;
- The subdivision enables an environmentally responsible solution to servicing Vermont Pitt Town via the reuse of treated non-potable water;

- 3. The land, adjacent to a newly constructed Hawkesbury Council sewer pump station asset, is considered appropriate for its future Water Recycling Facility use;
- 4. This site has been located with respect to minimising environmental impact and vegetation removal, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact;
- 5. The proposal does not create a rural land use conflict;
- Enables the land to be transferred to a licensed sewer authority (as defined by WICA legislation) for the establishment of cost effective sewer infrastructure to service Vermont Pitt Town – a residential project approved under Part 3A of the Environmental Planning and Assessment Act 1979;
- As outlined in the Council report from 25 August 2008, the alternative sewer solution reduces infrastructure costs and improves the viability of Vermont Pitt Town;
- 8. No dwelling entitlement is required for the subdivided allotment;
- 9. The Water Recycling Facility building is expected to be designed and built to replicate a dwelling house structure with large setbacks to Bootles Lane and Johnston Street (refer *Figure 3*) and the use of non-reflective building materials. Supplementary planting will also occur, including screen plantings to reduce visual effect. This will be documented in a secondary application relating to the Water Recycling Facility structure itself;
- 10. No advertising structures are proposed;
- 11. The proposal does not pave the way for traffic generating developments.



Bootles Lane

Figure 3: Preliminary Water Recycling Facility Site Plan – For Information Only (Proposed site arrangement subject to investigations and approvals)

6 SEPP 1 Tests

The Land and Environment Court of NSW and the Court of Appeal has established criteria for the preparation of SEPP 1 objections and in determining whether a SEPP 1 objection can be supported by a consent authority. When considering a SEPP 1 objection, a consent authority is required to undertake an assessment to vary a development standard and not a merit assessment of the development proposal as a whole.

These tests were first introduced in the *Winten Property Group –v- North Sydney Council* (2001) NSWLEC (6 April 2001). The proposal addresses the tests in the following manner.

(1) Is the planning control in question a Development Standard?

Clause 11 of the Hawkesbury Local Environmental Plan 1989 tabulates the minimum lot size (if not lot averaging subdivision) of 10 hectares for the Environmental Protection – Agriculture Protection (Scenic) zone (land shown hatched on map).

The planning control relating to this SEPP 1 objection is therefore deemed to be a development standard.

(2) What is the underlying object or purpose of the Standard?

The objectives of Clause 11 are not specified in the Hawkesbury Local Environmental Plan. However, it is interpreted that the purpose of the Standard is to ensure that land zoned for the Environmental Protection – Agriculture Protection (Scenic) zone protects the agricultural potential of the land and does not unduly fragment the land or permit it to be developed more intensely to create potential rural land use conflicts.

(3) Is compliance with the Development Standard consistent with the aims of the Policy, and in particular does compliance with the Development Standard tend to hinder the attainment of the objects specified in section 5(a)(i) and (ii) of the EP&A Act 1979?

State Environmental Planning Policy No.1 – Development Standards, provides, at Clauses 6 and 7, respectively, that:

- 6. where development could, but for any development standard, be carried out under the Act (either with or without the necessity for consent under the Act being obtained therefore) the person intending to carry out the development may make a development application in respect of that development, supported by a written objection that compliance with that development standard is unreasonable or unnecessary in the circumstances of the case, and specifying the grounds of that objection.
- 7. where the consent authority is satisfied that the objection is well-founded and is also of the opinion that granting of consent to that development application is consistent with the objectives of this Policy, as set out in clause 3, it may, with the concurrence of the Director, grant consent to that application notwithstanding the development standard the subject of the objection in clause 6.

The objective of the State Policy is, this Policy provides flexibility in the application of planning controls operating by virtue of development standards in circumstances where strict compliance with those standards would, in any particular case, be unreasonable or unnecessary or tend to hinder attainment of the objectives specified in section 5(a)(i) and (ii) of the Act.

The relevant objectives of the Act are as follows:

- 5(a)(i) [to encourage] the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.
- 5(a)(ii) [to encourage] the promotion and co-ordination of the orderly and economic use and development of the land.

As is the case with this proposed subdivision (to permit a Water Recycling Facility pursuant to *State Environmental Planning Policy (Infrastructure) 2007*) compliance with the development standard is not necessary and the resulting subdivision will continue to enable the objectives of the Environmental Protection – Agriculture Protection (Scenic) zone to function as listed in *Section 5* of this submission.

(4) Is compliance with the Development Standard unreasonable and unnecessary in the circumstance of the case? Also, is a development that complies with the Development Standard unreasonable and unnecessary?

Compliance with the development standard is considered unreasonable and unnecessary as the proposal will facilitate the objectives of the respective zone that applies to the land.

The development standard in this instance is considered unnecessary and unreasonable as maintaining the development standard does not contribute to the protection of the land as effectively as the zone provisions relating to land use permissibility or the land use objectives.

(5) Is the objection well founded?

The 10 hectare development standard is unreasonable and unnecessary in this instant as the subdivision (with no dwelling entitlement):

- 1. is on land that is already less than the minimum lot size hence compliance with this development standard is impossible, and
- 2. is required to enable the establishment of a Water Recycling Facility pursuant to *State Environmental Planning Policy (Infrastructure)* 2007 and WICA 2006 legislation.

This site has been located with respect to minimising environmental impact and vegetation removal, co-locating services, topography and accessibility. Little opportunity exists to locate this infrastructure elsewhere on the subject land without causing increased environmental impact. Positioning the infrastructure in this location improves the viability of the Part 3A approved Vermont Pitt Town residential development project.

On the basis of the information within this submission and the supporting Statement of Environmental Effects, the objection is considered to be well founded by virtue that the objection results in a balanced land use outcome and provides an orderly and economic use of the land resource.

7 Conclusion

The objection satisfies the applicable SEPP 1 test and if supported, will facilitate the orderly development of the Part 3A approved Vermont Pitt Town residential development. The variation sought to the development standard does not conflict with the objectives of the Environmental Protection – Agriculture Protection (Scenic) zone.

Maintaining the 10ha minimum development standard in this instant is unnecessary and unreasonable and therefore SEPP 1 concurrence to this proposal is sought from Department of Planning.

ANNEXURE 1: Draft Plan of Subdivision



ANNEXURE 2: Director General's Assessment Report



MAJOR PROJECT ASSESSMENT: Pitt Town Concept Plan



Director-General's Environmental Assessment Report Section 75I of the Environmental Planning and Assessment Act 1979

July, 2008

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1 EXECUTIVE SUMMARY

- **1.1** On 12 October 2007 the Minister for Planning declared that the Pitt Town Residential Precinct is a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979*, and authorised the submission of a concept plan for the site.
- **1.2** On 10 January 2008, the Johnson Property Group (JPG, the Proponents) submitted a concept plan for the Pitt Town Residential Precinct in response to the Director-General's Environmental Assessment Requires issued on 15 November 2007.
- **1.3** This application follows rezoning of the Pitt Town Investigation Area in August 2006 (Hawkesbury LEP Amendment No. 145) which allowed for a total of approximately 631 lots on land which is currently predominantly disused farm land. HLEP Amendment No. 145, however, deferred an area north of Hall Street in the north-west of the study area mainly because it was considered that further study was required of matters related to Aboriginal and European heritage.
- **1.4** It is important to note that the 631 lot yield estimate from LEP 145 is a conservative estimate of the number of lots achievable under the LEP. In various estimates provided to the Department by Council for LEP 145 this lot yield raises to as much as 699 lots.
- **1.5** In essence, the concept plan involves: changing density controls for land covered by LEP 145; and expanding urban land to the north and north-east, enlarging the JPG footprint to 129.22ha. While the concept plan only relates to JPG owned or controlled land, the net effect of changing the urban land and density controls results in a **total of 893 net additional lots** (943 total, including 50 existing lots) within the Pitt Town Investigation Area rather than 631. This is shown in the table below.

Precinct	Existing lots	Proposed lots	Net additional lots		
JPG concept plan precincts					
Fernadell (JPG)	1	210	209		
Bona Vista (JPG)	2	246	244		
Blighton (JPG)	2	22	20		
Cleary (JPG)	6	112	106		
Thornton (JPG)	1	69	68		
"Others" (non JPG concept plan)					
Central Precinct (non JPG)	28	194	166		
Cattai (non JPG)	9	80	71		
Thornton East (non JPG)	1	10	9		
Total Pitt Town Lot Yield	50	943	893		

- **1.6** The JPG concept plan proposes a **total of 659 lots** (or 647 net additional lots excluding existing lots), on land owned or controlled by JPG, comprising 390 residential lots and 269 rural lots.
- 1.7 Parallel with the concept plan consideration, JPG have requested the Minister also rezone the land deferred from HELP 145 (north of Hall Street and known as the Blighton and Cleary Precincts in the JPG concept plan) to Rural Housing, and that the Minister amend density and lot size controls in Hawkesbury LEP 1989 (using the Major Projects SEPP) for JPG owned or controlled land to reflect the lot sizes proposed in the concept plan. This is subject to a separate submission to the Minister.
- **1.8** Land within the precinct identified as 'Cattai' is also included in the proposed LEP amendment, however this precinct has been excluded from the concept plan as it is not owned by JPG. The minimum lot size control in Council's LEP for Cattai should be amended to be consistent with the adjoining Thornton Precinct (as is currently the case in LEP 145), and likewise the adjoining Thornton East precinct (which is not included in the JPG documentation).
- **1.9** The concept plan was exhibited for 30 days between 23 January 2008 and 22 February 2008.
- **1.10** A total of 49 public submissions were received, 36 objecting to the proposal and 13 offering conditional support. Submissions were also received from Hawkesbury City Council, Department of Environment and Climate Change (DECC), Department of Primary Industries (DPI), Department of Water and Energy

(DWE), NSW Rural Fire Service (RFS), Ministry of Transport (MoT) and the NSW Roads and Traffic Authority (RTA). The main issues raised during exhibition were: heritage impacts; impacts on the character of the locality; impact on existing residential amenity; traffic; and local/regional infrastructure requirements. These issues were able to be resolved through amendments to the statement of commitments or modifications imposed by the Minister.

- **1.11** The proponent has submitted a Preferred Project Report and a revised Statement of Commitments to address the issues raised during the exhibition period. The following design changes were made to the original proposal and incorporated into the PPR:
 - Reduction in size of the proposed Blighton Riverside Park due to care, control and management issues raised by Council. To maintain the required riparian buffer to the Hawkesbury River the open space will be a minimum width of 45 metres. The northern lots in Cleary and Thornton Precincts have been extended such that the large area of open space proposed in the original concept plan, including the detention basin in Thornton Precinct will be retained in private ownership.
- **1.12** Due to concerns raised by the Heritage Office of the Department of Planning, a modification has also been composed recommending that 6 lots proposed along the western side of the Blighton Precinct be amalgamated into 3 larger lots, with the aim of maintaining the open vista of land that was formally part of Governor Bligh's Farm when viewed from the historically significant area known as the Pitt Town Bottoms.
- **1.13** Regional infrastructure contributions for land owned by JPG have been determined through an existing Voluntary Planning Agreement (*Pitt Town Planning Agreement*).
- **1.14** Funding for local infrastructure will be required through a revised section 94 plan, which has been prepared by consultants engaged by the Department of Planning, and in consultation with planning officers from Hawkesbury City Council (see briefing note Y08/1211). Local infrastructure to be funded will include a community centre, passive and active recreation facilities including playing fields, and local roads. In this regard, the proposed section 94 plan provides for the key infrastructure priorities identified by representatives of the Pitt Town community at a meeting with the Minister in 2007 including:
 - 4 playing fields 3 playing fields would be accommodated on Fernadell Park (requiring an additional 0.72ha of land to be acquired). The fourth field would be provided through upgrade of the existing playing field at Brinsley Park in the existing village. This playing field is not currently used due to the substandard quality of the playing surface. The section 94 plan includes costing for change room facilities at Blighton and Fernadell Park, but not Brinsley Park where such facilities are already provided.
 - **Pitt town bypass** The section 94 plan has been amened to include funding of the Pitt Town Bypass. Approximately half of the cost of the Bypass would be funded through Regional Infrastructure Contributions (RIC) from land not the subject of the existing Pitt Town Planning Agreement. This RIC has been included in the section 94 plan.

The revised section 94 plan would see the contribution applying to all land **increase slightly from \$24,816 per lot to \$25,709 per lot** (March 2008 costings). Lots not the subject of the Pitt Town Planning Agreement would be subject to an additional RIC under the section 94 plan of \$25,763 per lot (a total contribution of \$51,472 per lot).

1.15 In balancing the State significant planning outcomes with the issues raised, the Department is of the view that the proponent has satisfactorily mitigated the impacts arising from the proposed subdivision. In assessing the proposal, the Department has resolved any outstanding issues through recommended modifications to the concept plan (see **Appendix A**).

2 BACKGROUND

2.1 The site and surrounding area

The township of Pitt Town is located 6km north east of Windsor, in the north-western sector of Sydney.

Land known as the Pitt Town Investigation Area (i.e. land subject to LEP 145, including deferred lands) is approximately 225ha in area and is locally wholly within the Hawkesbury LGA. The investigation area includes land above the 20m AHD contour to the north of the Pitt Town township proper, and is generally bounded by the Hawkesbury River to the north, Cattai Road to the east, Buckingham Street to the south and Bathurst Street to the west.

The total investigation area is controlled by a number of landowners. JPG owns or controls approximately 129ha of the total investigation area.

The site was used for many years for agriculture and orcharding, although most of the orchard trees have been removed. There are some areas of remnant bushland within and surrounding the site and there are several windrows of predominantly pine trees. There are houses scattered throughout the site together with farm buildings and other improvements typical of land that has been farmed for many years.

The site is generally above the 100 year flood level and is generally surrounded by rural, low density development to the west, north and east with the village of Pitt Town to the south.



Figure 1 below shows the location of Pitt Town and the surrounding region.

Figure 1. Location map

The concept plan the subject of this report covers land within the Pitt Town investigation area that is owned or controlled by JPG. In this regard, the concept plan area covers land included in Hawkesbury LEP amendment No. 145 plus an area north of Hall Street omitted from LEP 145, but excludes land generally between Johnston Street and Hall Street

Figure 2 below shows the concept plan area and defines precinct names which are referred to in the Environmental Assessment report. However, it is important to note that the Cattai Precinct is included for identification purposes only and does not actually form part of the JPG concept plan area.



Figure 2. Concept Plan Precincts (excluding Cattai)

To the north is the Hawkesbury River and beyond, the villages of Ebenezer and Wilberforce, which are surrounded by rural land uses. The River also passes to the west of the site, separated from it by the Pitt Town Bottoms.

To the east of the site, beyond Cattai Road there are rural residential style dwellings and beyond those is the Scheyville National Park. Pitt Town village is located to the south of the site.

2.2 Planning history and current status

A brief planning history of the Pitt Town investigation area is outlined below:

- Hawkesbury Council commissioned the preparation of a local environmental study (LES) in 2003. The
 investigation area for the LES was based on land above the 20 metre AHD contour. This contour is just
 above the highest recorded flood level.
- Hawkesbury Council then prepared a draft LEP which was informed by the LES.

- Hawkesbury LEP 1989 Amendment 145 (LEP 145) was gazetted on 18 August 2006 allowing for 631 lots to be developed within a development area of approximately 174 hectares.
- A section 94 local contributions plan and Development Control Plan for Pitt Town were also formulated by Council to accompany LEP 145. Levies payable under the s94 plan totalled \$24,816 per lot.
- JPG also entered into a Voluntary Planning Agreement with the Minister for Planning on 26 July 2006 for the provision of \$16.5 million worth of regional infrastructure – i.e. public school, road works and DECC contribution.

Current zones under LEP 145 are shown in Figure 3 below.



Figure 3. Current zones under LEP 145

- Following the gazettal of LEP Amendment No 145, development consent was granted by Council for development of 225 lots with the Bona Vista Precinct (Consent DA 0557/06, approval date 3 May 2007) by JPG. Construction of these lots has commenced and they have been incorporated into the concept plan layout for the Bona Vista Precinct.
- Land at the north and north-east of the investigation area was excluded from LEP 145 as a result of the need for further consideration of heritage significance in this location. This area of land is not currently listed as having heritage significance in the State Heritage Register and was otherwise suitable for rural residential development.
- Subsequently JPG prepared a number of studies assessing heritage significance for the land excluded from the LEP. This land is known as Blighton and was the site of Governor Bligh's Farm. These studies indicated that the land is generally suitable for development provided certain development and design controls are imposed to protect the heritage landscape.
- On the 23 November 2006 the Department wrote to Hawkesbury City Council advising that it would be
 prepared to consider some additional development at Pitt Town beyond the 631 lots allowed by HLEP 145.
- JPG subsequently lodged a draft LEP with Council for development of land under their ownership or control
 for 1,104 lots within an expanded development footprint (i.e. including land north of Hall Street, which was
 previous deferred in LEP 145). Council resolved to proceed with the draft LEP on 31 July 2007 and notified
 the Department of its decision. The Minister declined to issue the Section 65 Certificate, however agreed to
 consider the proposal as a Major Project under Part 3A of the Environmental Planning and Assessment Act
 1979 and authorised the submission of a Concept Plan for the site with a reduced number of lots from the
 draft LEP endorsed by Council.
- JPG has prepared a concept plan for the development showing a total of 659 lots, comprising 390 residential lots and 269 rural lots.
- Parallel with the concept plan consideration, JPG have requested the Minister also rezone the land deferred from HELP 145 (north of Hall Street and known as the Blighton and Cleary Precincts in the JPG concept plan) to Rural Housing, and that the Minister amend density and lot size controls in Hawkesbury LEP 1989 (using the Major Projects SEPP) for JPG owned or controlled land to reflect the lot sizes proposed in the concept plan.
- Land within the precinct identified as 'Cattai' is also included in the proposed LEP amendment, however this
 precinct has been excluded from the concept plan as it is not owned by JPG. The minimum lot size control in
 Council's LEP for Cattai will need to be amended to be consistent with the adjoining Thornton Precinct (as is
 currently the case in LEP 145), and likewise the adjoining Thornton East precinct (which is not included in the
 JPG documentation).
- Including 194 rural housing lots already zoned under Hawkesbury LEP 145, 80 lots proposed for the Cattai
 Precinct and 10 lots in Thornton East, a total of 893 net additional lots (943 total, including 50 existing lots)
 are proposed for the entire Pitt Town Investigation Area. The following is a summary of the potential lot yield
 for Pitt Town, based on the JPG concept plan and development outside the concept plan area, whilst the
 diagram on the next page illustrates existing LEP 145 land and land subject to zoning and density control
 amendments as a consequence of the JPG proposal:

Precinct	Existing lots	Proposed lots	Net additional lots				
JPG concept plan precincts							
Fernadell (JPG)	1	210	209				
Bona Vista (JPG)	2	246	244				
Blighton (JPG)	2	22	20				
Cleary (JPG)	6	112	106				
Thornton (JPG)	1	69	68				
"Others" (non JPG concept plan)							
Central Precinct (non JPG)	28	194	166				
Cattai (non JPG)	9	80	71				
Thornton East (non JPG)	1	10	9				
Total Pitt Town Lot Yield	50	943	893				

- The purpose of this submission is for the Director General to provide a report on the project to the Minister for the purposes of deciding whether or not to grant approval of the concept plan pursuant to Section 75O(2)(a) of the Act. Section 75N of the Act provides that the scope of the Director General's environmental assessment report for a concept plan is the same as with respect to approvals to carry out a project as set out in Section 75I(2) of the Act. This report recommends the Minister should grant concept approval subject to modifications set out in the instrument of approval set out at **Appendix A**.
- The Department also recommends that the Major Projects SEPP be amended by adding the Pitt Town
 investigation area to Schedule 4 to enable the Minister to amend Hawkesbury LEP 1989 to reflect the
 development contemplated by the concept plan. This is subject to a separate submission to the Minister.
- Figure 4 below illustrates the proposed new zoning map for Pitt Town. It is important to note that areas not
 included in this map but affected by LEP 145 continue to be covered by LEP 145 in terms of zoning and lot
 size.



Figure 4. Proposed zoning map (for JPG land and Cattai Precinct)

3 PROPOSED DEVELOPMENT

3.1 Approval Originally Sought

3.1.1 Concept Plan

On 10 January 2008 the proponent submitted an Environmental Assessment (EA) report titled *Pitt Town Residential Precinct* (folder 1 & 2), prepared by Don Fox Planning (DFP). The EA served three purposes:

- 1. To address the project specific issues outlined in the Department of Planning's Director-General Environmental Assessment Requirements (DGEARs);
- 2. To present a Concept Plan for the site; and
- To request amendment of Hawkesbury LEP 1989 (via the Major Projects SEPP) to reflect the lot sizes proposed in the concept plan application for JPG owned or controlled land, plus land not owned or controlled by JPG in the Cattai precinct.

The key feature of the proposal is allowing an increased yield than currently exists under LEP 145 within the concept plan area by reducing the minimum permitted lot size and to extend the 'footprint' of urban land to the north and north-east. This results in approx 41ha of land for conventional residential, and approx 88ha of land for rural housing. Specifically, the concept plan seeks approval for:

- Subdivision to create a total of 659 allotments, including
 - 390 conventional residential allotments
 - 269 allotments for rural housing.
- Provision of a 4.1 metre wide boat ramp with 16 car parking spaces and 14 car/trailer parking spaces adjacent to the Hawkesbury River (proposed to be dedicated to Council).
- Provision of related infrastructure comprising water supply mains, sewerage mains, road works, stormwater mains and water quality control and detention works.

A breakdown of proposed lots per precinct can be seen in **Table 1** below. As can be seen from the table the total number of lots on land owned or controlled by JPG (which is the subject of the concept plan proposal) will be 659. The total number of lots possible in the entire Pitt Town Investigation Area, based on current LEP 145 development controls and proposed new density controls for the JPG concept plan precincts and Cattai and Thornton East precincts will be 943. Taking into account the 50 existing lots within these precincts, this represents a **net increase of 893 lots**.

	MINIMUM LOT SIZE								
PRECINCTS	550m ²	650m ²	750m ²	1,000m ²	2,000m ²	2500m ²	1ha	5 lots per ha	Total Lots
Bona Vista		52	144	50					246
Fernadell	194			16					210
Blighton					17		5		22
Cleary					112				112
Thornton					7	62			69
TOTAL (JPG)	194	52	144	66	136	62	5	0	659
Others – i.e. Cattai, Central & Thornton East Precincts					48 (Central)	90 (Cattai & Thornton East)		146 (Central)	284
TOTAL LOTS									943

Table 1 – Development yield

By way of comparison, LEP 145 would currently yield a total of 401 lots on land owned or controlled by JPG and 45 lots within the Cattai precinct. Therefore, the concept plan (and accompanying rezoning) would allow an additional 258 lots on JPG land and 35 lots in the Cattai precinct.

The Concept Plan layout for the development is shown in Figure 5.



Figure 5. Original Concept Plan

3.1.2 Utilities & State/Local Infrastructure

Utilities

Utility infrastructure will be provided as necessary to service each stage of the development. JPG are in the final stages of constructing a \$5.5M main water trunk main from a connection point at Windsor Road through to Pitt Town. This is as approved by Sydney Water. The Windsor Road main that Sydney Water approved as their connection point is ultimately serviced from the North Richmond Water Filtration Plant, via the South Windsor reservoir. Sydney Water has a three stage plan to upgrade water supply as part of the Hawkesbury Urban Land Strategy. They have completed Stage 1 with the remaining stages undertaken as future development in the Hawkesbury and Penrith areas proceed. Once the 3 stage program is complete, the Windsor zone (including Pitt Town) will be serviced from Warragamba Dam via Orchid Hills water filtration plant.

The sewer is being designed and constructed to cater for 1287 lots. This is outlined in JPG's sewer servicing strategy, in consultation with Hawkesbury Council. The basic sewer reticulation arrangement is as follows:

- 1. Installation of a new Pump Station as part of the JPG Pitt Town development known as PT1.
- 2. The existing sewer pump station in Pitt Town, catering for existing Pitt Town, will also drain into new PT1.
- 3. A new transfer rising main will connect PT1 to McGrath's Hill Sewer Treatment Works.
- 4. McGrath's Hill Sewer Treatment Works is currently at capacity. To enable spare capacity at McGraths Hill, JPG will divert existing flows from another sewer treatment system (not relating to Pitt Town) from an existing pump station (known as Pump Station C) to South Windsor.

Water, sewer, electricity, telecommunications and gas will initially be provided along Bootles Lane to service the Bona Vista development. The Fernadell land will also utilise the services provide along Bootles Lane. Blighton, Cleary, Thornton and the Cattai Precinct will be serviced by progressively extending the infrastructure along Bathurst Street and Hall Street. Development of Cattai Precinct is not likely to proceed until after the other precincts are developed because of the need to extend infrastructure precinct by precinct. If the owners of this land intend to commence earlier, they will have to fund the extension and provision of services along Hall Street.

Roads and Community Facilities

Regional Infrastructure Contributions for land owned by JPG have been determined through an existing Voluntary Planning Agreement. The VPA includes:

- Dedication of land for expansion of Pitt Town Public School \$2,000,000;
- Pitt Town Road Intersection Works \$1,700,000;
- The shoulder works (Pitt Town Road) \$11,200,000;
- A monetary contribution to Department of Conservation for regional conservation (now Department of Environment and Climate Change) \$630,000; and
- A monetary contribution to school building \$976,000.

Infrastructure to be funded in a revised s94 plan will include a community centre, passive and active recreation facilities including playing fields, and local roads. In this regard, the proposed section 94 plan provides for the key infrastructure priorities identified by representatives of the Pitt Town community at a meeting with the Minister in 2007 including:

- 4 playing fields 3 playing fields would be accommodated on Fernadell Park (requiring an additional 0.72ha of land to be acquired). The fourth field would be provided through upgrade of the existing playing field at Brinsley Park in the existing village. This playing field is not currently used due to the substandard quality of the playing surface.
- **Pitt town bypass** The section 94 plan has been amened to include funding of the Pitt Town Bypass. Approximately half of the cost of the Bypass would be funded through Regional Infrastructure Contributions (RIC) from land not the subject of the existing Pitt Town Planning Agreement. This RIC has been included in the section 94 plan.

3.1.3 Staging

The development of JPG land is intended to proceed in the five precincts known as Bona Vista, Fernadell, Blighton, Cleary and Thornton. Development will commence in Bona Vista, providing lots ranging in size from a minimum of 650m² to a minimum of 1000m² along Johnston Street and adjacent to the Bona Vista homestead and curtilage. It is the current intention that the 246 lots within Bona Vista be developed prior to proceeding to other areas.

Once Bona Vista is completed and depending on market conditions Fernadell and Cleary lands will be developed concurrently, providing a variety of lots ranging from a minimum of 550m² to a minimum of 2000m². As the development of Cleary concludes, the 22 larger lots on Blighton will be developed, followed by the Thornton Precinct. Since the Cattai Precinct is dependant on services being provided through the other precincts, it is envisaged that Cattai will not proceed until the remaining precincts are complete. Cattai Precinct is not under the control of JPG and the owners of the land may decide to proceed earlier but in that case would need to provide funds to extend the services.

3.2 Amendments to the Proposal

The proponent lodged a Preferred Project Report (PPR) on 31 March 2008 (refer **Appendix C**), incorporating a revised Statement of Commitments (included in **Appendix B**) to address the issues raised during the during the consultation period.

The following changes were made to the original proposal and incorporated into the PPR:

- Concept Plan amended to reduce size of Blighton Riverside Park as Council could not commit to care, control and management of such a large area. To maintain the required riparian buffer to the Hawkesbury River the open space will be a minimum width of 45 metres. The northern lots in Cleary and Thornton Precincts have been extended such that the large area of open space proposed in the original concept plan, including the detention basin in Thornton Precinct will be retained in private ownership.
- In their revised Statement of Commitments JPG have given an undertaking that if an agreement cannot be reached with Council for the transfer of the Riverside Park, then JPG will retain the land in private ownership, but on the basis that it is fully accessible to the public and adequately maintained.
- Various other Commitments have also been amended due to concerns raised by State government agencies and Council regarding various issues concerning European and indigenous heritage conservation, stormwater management and impact on existing watercourses.

An amended concept plan is shown in **Figure 6** below.



Figure 6. Amended Concept Plan (Preferred Project Report)

4 STATUTORY FRAMEWORK

4.1 Part 3A of the Environmental Planning and Assessment Act 1979

Part 3A of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) commenced operation on 1 August 2005. Part 3A consolidates the assessment and approval regime of all major projects previously considered under Part 4 (Development Assessment) or Part 5 (Environmental Assessment) of the EP&A Act.

Under the provisions of Section 75B of the EP&A Act development may be declared to be a Major Project by virtue of a State Environmental Planning Policy or by order of the Minister published in the Government Gazette.

Section 75M of the Act permits a proponent to lodge a Concept Plan either upon their request to or at the request of the Minister. The purpose of the Concept Plan is to provide a broad overview of a proposed development and seeks to establish the framework for more detailed development of the proposal subject to future approvals.

The Concept Plan process will enable the complex strategic issues and the general parameters of the project to be determined upfront, whilst still retaining the necessary level of flexibility for the more detailed design phase of the project. Retaining some flexibility in the later stages of the redevelopment will be important to ensure future development opportunities on the site remain innovative and responsive to staging over time.

On 12 October 2007, the Minister for Planning formed the opinion that Part 3A of the Act applied to the proposed development and, pursuant to Section 75M of the Act, authorised the proponent to submit a Concept Plan for Pitt Town.

4.2 State Environmental Planning Policy (Major Projects) 2005

State Environmental Planning Policy (Major Projects) 2005 outlines the types of development declared a major project for the purposes of Part 3A of the EP& A Act. For the purposes of the SEPP certain forms of development may be considered a Major Project if the Minister (or his delegate) forms the opinion that the development meets criteria within the SEPP.

On 12 October 2007, the Minister formed the opinion that the Pitt Town Residential Precinct is a development described in Schedule 1 Clause 13 – Residential, commercial or retail projects, namely:

"Development for the purpose of residential, commercial or retail projects with a capital investment value of more than \$50 million that the Minister determines are important in achieving State or regional planning objectives".

As the capital investment value of the project exceeds the \$50 million threshold and the development is deemed to be important in achieving State and regional planning objectives it is considered to be a Major Project and therefore subject to Part 3A of the EP & A Act.

4.3 Permissibility

In order to accommodate the proposed development, Hawkesbury LEP 1989 will need to be amended to reflect the new lot sizes proposed in the concept plan. This is intended to be achieved via the Major Projects SEPP should the concept plan be approved by the Minister and prior to any subsequent approval.

Aspects of the Pitt Town concept plan are prohibited by the current planning provisions within Hawkesbury Local Environmental Plan (Amendment No. 145) (Hawkesbury LEP) - i.e. yield and lot sizes. In this regard, clause 10(5) of Hawkesbury LEP currently reads as follows:

"All subdivision is prohibited on the land shown on the map marked "Hawkesbury Local Environmental Plan 1989 (Amendment No 145)" unless the area of each lot created for a dwelling house is equal to or greater than the minimum lot sizes for the land shown on the map and the number of lots created does not exceed the density control for the land."

Clause 10(6) of Council's LEP also clarifies that *State Environmental Planning Policy No 1—Development Standards* does not apply to subclause (5).

Currently, Hawkesbury LEP has a designated minimum lot size of 750m² within the 'Housing Zone'. This is proposed to be amended to allow lots sizes of 550m² to 750m² in the Housing Zone and 1000m² to 1ha in the 'Rural Housing Zone'.

In detail, the amendments involve:

4.3.1 Reducing the minimum lot sizes within Fernadell and parts of Bona Vista Precincts of the site

Hawkesbury LEP provided for the bulk of the lots within the Fernadell Precinct to be minimum 750m² size lots, with 4000m² lots fronting Bathurst Street, compared to the current proposal which provides for minimum 550m² lots, except for lots fronting Bathurst Street which are to be minimum 1000m².

Within Bona Vista Precinct, Hawkesbury LEP provided for minimum 750m² lots over most of the precinct, except for 1500m² lots fronting Johnston Street and Bona Vista homestead. The current plan reduces the size of the fringing lots from 1500m² to 1000m² and reduces the size of the lots in the south eastern part of the precinct to 650m².

4.3.2 Increasing the densities within Thornton, Cattai and parts of Cleary Precincts of the site

Within Thornton and Cattai Precincts, the density is increased from 2 lots per hectare under LEP Amendment 145 (effectively 4000m² to 4500m² lots once road areas are deducted), to minimum 2500m² lots.

The density within the eastern part of Cleary Precinct is increased from 3 lots per hectare (effectively 3000m² lots) to minimum 2000m² lots.

4.3.3 Extending the Rural Housing zone over Blighton and parts of Cleary Precincts of the site

The Rural Housing Zone with a 2000m² minimum size lot provision (as described above for the eastern part of Cleary Precinct) is extended over the remainder of Clearly Precinct. The Rural Housing Zone is also extended over Blighton Precinct with a minimum lot size of between 4000m² and 1ha.

4.3.4 Mechanism to rezone

The Department considers that rezoning and identifying permissible land uses is essential to this project. This is best achieved via Ministerial intervention using the Major Projects SEPP to rezone the land. The reason for this approach would be to overcome the current council delays, which has the potential to affect delivery of the NSW Government planning forecasts for this part of the State. This approach would allow the Minister to act independently of council and the proponent in reaching a decision about the development of the site and the level of developer contributions that should be levied. The proposed rezoning is subject to a separate briefing note to the Minister.

Pitt Town is considered to be of significance for environmental planning for the State for the following reasons:

- The project is located in an area identified in the subregional strategy for urban renewal and increased urban development and there are local impediments to the implementation of the development identified as a result of consultation with local council to implementing the project. The draft North West Subregional Strategy establishes a dwelling target for Hawkesbury LGA of 5,000 additional dwellings to be achieved by 2031. This target assumes growth at Pitt Town in accordance with Hawkesbury LEP and recognises that there may be some additional growth at Pitt Town subject to consideration of development constraints, in particular flood evacuation.
- The project will contribute to employment and residential growth in an urban renewal area identified in the North West Subregional Strategy. The Pitt Town proposal has a CIV of approximately \$140 million and will create approximately 1,430 full time jobs and 1,100 part time jobs over the 10 year development period. The project will create a total of 943 residential and rural/residential lots in the Pitt Town Investigation Area, thus helping to meet dwelling targets in the Strategy.

4.4 Director General's Environmental Assessment Requirements

On 15 November 2007, the Director General issued environmental assessment requirements (DGEARs) pursuant to Section 75F of the EP & A Act. The key issues to be addressed in the DGEARs issued related to: subdivision layout and design; heritage conservation; traffic generation and management; stormwater management and disposal; biodiversity and cultural heritage; flooding; bushfire risk assessment; hydrology and water management; utilities and infrastructure provision; transport and access; section 94 developer contributions/section 93 planning agreements; and community consultation.

4.5 Other relevant legislation and environmental planning instruments

Section 6 and **Appendix F** both set out the approval process, relevant consideration of legislation, environmental planning instruments and planning strategies as required under Part 3A of the EP&A Act.

5 CONSULTATION AND ISSUES RAISED

The Environmental Assessment Report (EA) was publicly exhibited and notified in accordance with the EP&A Act. Section 75H(3) of the EP & A Act requires that after the Environmental Assessment has been accepted by the Director General, the Director General must, in accordance with any guidelines published in the Gazette, make the environmental assessment publicly available for at least 30 days. The Director General has not published any specific guidelines in relation to the public exhibition of the application.

A "Test of Adequacy" was undertaken by the Department which determined that the matters contained in the DGRs were adequately addressed in the Environmental Assessment prior to public exhibition.

In accordance with Section 75H of the Act, the environmental assessment was publicly exhibited for a period of 30 days from 23 January 2008 to 22 February 2008 at the following locations:

- Department of Planning (Head Office) Information Centre, 22 33 Bridge Street, Sydney
- Hawkesbury City Council Council Chambers 366 George Street, Windsor

The EA was placed on the Department's website during the course of the exhibition period.

Local stakeholders within proximity of the site were informed of the concept plan proposal in writing and invited to make a written submission. Details of the concept plan proposal were placed in the public notices section of the local newspaper. The advertisement provided details of the proposal, exhibition locations and dates and how interested parties could make a submission. Government agencies, Hawkesbury City Council and other public authorities were also consulted.

In response to the exhibition period, the Department received submissions from Hawkesbury City Council, DECC, DPI, DWE, RFS, MoT and the RTA. A total of 49 public submissions were received, 36 objecting to the proposal and 13 offering conditional support. A summary of public submissions received and agency submissions are included at **Appendix D**.

A detailed report responding to these submissions, prepared by JPG, was incorporated into a Preferred Project Report and submitted to the Department on 31 March 2008 (included at **Appendix C**).

To fulfil the requirements of Section 75I Clause 2(b) this report includes advice provided by public authorities regarding the issues to be addressed by the proponent in the EA. These issues formed part of the key issues raised in the DGEARs. The Department has reviewed the EA, submissions to the preparation of the EA by public authorities, the submissions received from public authorities during the EA exhibition period and additional information provided by the proponent. Unless noted to the contrary below, the Department is satisfied that the responses provided by the proponent in their EA and the additional response to issues raised in submissions are reasonable.

6 ASSESSMENT

The Department has reviewed the EA and the preferred project report and considered advice from public authorities as well as issues raised in general submissions in accordance with Section 75I(2) of the Act. Consideration of each of the issues as they relate to the concept plan proposal is provided in **Section 6.2**.

Each relevant issue has been identified and duly considered followed by an explanation of how the proponent has sought to address the issue. Each subsection concludes with an explanation of how the Department has resolved the issue through the imposition of various modifications.

6.1 DIRECTOR-GENERAL'S REPORT

The purpose of this submission is for the Director-General to provide a report on the project to the Minister for the purposes of deciding whether or not to grant approval of the concept plan pursuant to Section 75O(2)(a) of the Act and project approval under Section 75J. Section 75N of the Act provides that the scope of the Director General's environmental assessment report for a concept plan is the same as with respect to approvals to carry out a project pursuant to Section 75I(2) under Part 3A of the Act.

Section 75I(2) sets out the scope of the Director General's report to the Minister. Each of the criteria set out therein have been addressed below, as follows:

(a) <u>a copy of the proponent's environmental assessment and any preferred project report; and</u>

The proponent's EA is included at **Appendix E** while the preferred project report is set out for the Minister's consideration at **Appendix C** along with the Statement of Commitments at **Appendix B**.

(b) any advice provided by public authorities on the project; and

All advice provided by public authorities on the project for the Minister's consideration is set out at Appendix D.

(c) <u>a copy of any report of a panel constituted under Section 75G in respect of the project; and</u>

No independent hearing and assessment panel was undertaken in respect of this project.

(d) <u>a copy of or reference to the provisions of any State Environmental Planning Policy (SEPP) that</u> <u>substantially govern the carrying out of the project; and</u>

A copy and brief assessment of each State Environmental Planning Policies that substantially govern the carrying out of the project is set out in **Appendix F**.

(e) except in the case of a critical infrastructure project – a copy of or reference to the provisions of any environmental planning instrument that would (but for this Part) substantially govern the carrying out of the project and that have been taken into consideration in the environmental assessment of the project under this Division; and

An assessment of the development relative to the relevant environmental planning instruments is provided in **Appendix F.**

(f) <u>any environmental assessment undertaken by the Director General or other matter the Director General</u> <u>considers appropriate.</u>

The environmental assessment of the project is this report in its entirety, which also meets the requirements of Clause 8B of the Environmental Planning and Assessment Regulation 2000.

(g) <u>a statement relating to compliance with the environmental assessment requirements under this Division</u> with respect to the project.

The proponent's EA addressed the DGR requirements and is considered to have satisfied those requirements as addressed in this report.

6.2 KEY ISSUES

The following section assesses each of the key issues associated with the proposal. Each relevant issue has been identified, followed by an explanation of how the proponent has sought to address the issue. Each subsection concludes with an explanation of how the issue has been resolved through the Departments recommended modifications of approval or through the proponent's Statement of Commitments or Preferred Project Report.

It is worth noting that the Statement of Commitments has been modified since the documentation was on public exhibition and that a number of issues raised during the exhibition period have been addressed by way of the revised Statement of Commitments and within the submitted Preferred Project Report.

6.2.1 Regional & Local Infrastructure

Regional

Regional Infrastructure Contributions for land owned by JPG have been determined through an existing Voluntary Planning Agreement (*Pitt Town Planning Agreement*). The VPA includes:

- Dedication of land for expansion of Pitt Town Public School \$2,000,000;
- Pitt Town Road Intersection Works \$1,700,000;
- The shoulder works (Pitt Town Road) \$11,200,000;
- A monetary contribution to Department of Conservation for regional conservation (now Department of Environment and Climate Change) \$630,000; and
- A monetary contribution to school building \$976,000.

To date, JPG has transferred land for the expansion of Pitt Town Public School and other items are pending. In this regard the Proponent and the RTA are in the final stages of finalising the Works Authorisation Deed (WAD) for the road intersection and shoulder works. The DECC contribution and the school building contribution is to be paid prior to the release of the first linen plans for the subdivision of the land.

Local

The Hawkesbury City Council Section 94 Contributions Plan currently sets out infrastructure contributions for development at Pitt Town under Hawkesbury LEP 145. If the JPG concept plan is approved local infrastructure will be required to support the additional development. In this regard, the Department has worked closely with Council officers to prepare proposed amendments to Council's section 94 plan.

Infrastructure to be funded in the revised s94 plan will include a community centre, passive and active recreation facilities including playing fields, and local roads. In this regard, the proposed section 94 plan provides for the key infrastructure priorities identified by representatives of the Pitt Town community at a meeting with the Minister in 2007 including:

- 4 playing fields 3 playing fields would be accommodated on Fernadell Park (requiring an additional 0.72ha of land to be acquired). The fourth field would be provided through upgrade of the existing playing field at Brinsley Park in the existing village. This playing field is not currently used due to the substandard quality of the playing surface. The section 94 plan includes costing for change room facilities at Blighton and Fernadell Park, but not Brinsley Park where such facilities are already provided.
- Pitt town bypass The section 94 plan has been amened to include funding of the Pitt Town Bypass. Approximately half of the cost of the Bypass would be funded through Regional Infrastructure Contributions (RIC) from land not the subject of the existing Pitt Town Planning Agreement. This RIC has been included in the section 94 plan.

The revised section 94 plan would see the contribution applying to all land **increase slightly from \$24,816 per lot to \$25,709 per lot** (March 2008 costings). Lots not the subject of the Pitt Town Planning Agreement would be subject to an additional RIC under the section 94 plan of \$25,763 per lot (a total contribution of \$51,472 per lot).

6.2.2 Aboriginal & European Heritage

Land at the north of the Pitt Town Investigation Area (existing Lots 11, 12, 14 and 15, located between Hall Street and the Hawkesbury River and within the Blighton and Cleary Precincts in the proposed concept plan – see **Figure 7** below) was excluded from LEP 145 as a result of the need for further consideration of heritage significance in this location. This area of land is not currently listed as having heritage significance in the State Heritage Register.



Figure 7. Existing Lots 11, 12, 14 & 15 within Blighton & Cleary Precincts (1 in 100 year flood level shown)

This area of land was otherwise suitable for rural residential development. Subsequently JPG prepared a number of studies assessing heritage significance for the land excluded from the LEP. This land is known as Blighton and was the site of Governor Bligh's Model Farm. These studies indicated that the land is generally suitable for development provided certain development and design controls are imposed to protect the heritage landscape.

The final outcome of the research into heritage significance of the subject lands was the preparation of a draft Conservation Management Strategy (CMS) by Graham Brooks & Associates. It is intended that the draft CMS will guide the future conservation management and further development of the parcels of land within the Blighton and Clearly Precincts.

The key Conservation Policies that arise from the Conservation Management Strategy can be summarised as follows:

6.2.2.1 Differing Heritage Values across the Subject Land

For conservation management purposes, Lots 11, 12, 14 and 15 can be divided into four portions, each with differing heritage values:

- Proposed Conservation Zone (refer grey area in Figure 8): The high ground along the northern portion of Lots 11 and 12 has a confluence of Aboriginal, Historical Archaeological and Historic Cultural Landscape values of State Significance. This area has been identified within a proposed Conservation Zone (public ownership). In essence the Conservation zone should be managed in a manner that protects the three complimentary State significant heritage values that have been identified: subsurface Aboriginal objects; subsurface relics from the Blighton period of occupation; and the outlook location on the edge of the northern ridge and the supporting open space backdrop to that outlook.
- Proposed Open Space Conservation Zone (refer orange area in Figure 9): The low-lying river flats land to the north of the proposed Conservation Zone, on Lots 11 and 12, is important for its surviving open landscaped character. This survival is primarily the result of periodic flooding that has prevented the erection of any structures associated with agricultural activities that were carried out on adjacent high ground. This area has no Aboriginal or Historical Archaeological values and relatively limited Historic Cultural Landscape values. It may also have Aboriginal associational values.

This area has been identified within a proposed **Open Space Conservation Zone** (private tenure) that is contiguous with the proposed Conservation Zone. The primary objective of this zone is to protect the visual curtilage of the Conservation Zone with regard to the Hawkesbury River valley.

The open ground in the southern portions of Lots 11 and 12 has very limited Aboriginal or Historical Archaeological value and only limited Historic Cultural Landscape value. It does not need to be contained within the proposed Conservation Zone.

 Land within Lots 14 and 15 has no defined heritage values that warrant special heritage management. Each of these components of Lots 11 and 12, and all of Lots 14 and 15 should be managed and developed in accordance with their recognised values.



Figure 8. Proposed Conservation Zone (Grey) and Open Space Conservation Zone (Orange)

6.2.2.2 Conservation Policies (Graham Brooks and Associates Draft CMA)

The proponent is proposing to adopt the recommendations and conservation policies of the draft Conservation Management Plan (CMA) by Graham Brooks and Associates (December 2005) (Appendix S in EA), as outlined below.

- Land within the proposed Conservation Zone and its contiguous Open Space Conservation Zone will be
 nominated to the NSW Heritage Council for inclusion in the NSW State Heritage Register and nominated to
 Hawkesbury City Council for inclusion in Hawkesbury LEP.
- Known or potential Aboriginal or Historical Archaeological relics, particularly those within the proposed Conservation Zone, will generally be left undisturbed. The installation of any underground services or other

works within the Conservation Zone is to be avoided. If any is required, consent under the relevant legislation must first be obtained from the NSW Department of Environment and Conservation or NSW Heritage Office. Development of land beyond the proposed Conservation Zone, where previous investigations have indicated the likely presence of Aboriginal or Historical Archaeological relics, and which is likely to disturb or destroy those relics, shall proceed only with consent under the relevant legislation.

- Development Guidelines for land within the proposed Conservation Zone (orange area) include:
 - Private ownership of the land within the proposed Conservation Zone is permissible.
 - Subdivision of the proposed Conservation Zone into long narrow lots, which extend into the adjoining residential land to the south is permissible.
 - Subdivision into lots shall be guided by the preparation of a Master Plan that may extend across all of the subject land and include Lots 13, 15, 16, 17 and 18.
 - The physical delineation between lots within the Conservation Zone shall be limited to the installation of rural style three strand wire fences, with timber posts and metal star pickets. Fences across or within lots along the southern boundary of the Conservation Zone shall be of a similar nature. Solid walls or screens, of any height are not permitted.
 - No new above ground structures, whether permanent, temporary or transitory, of any kind shall be permitted on any land within the Conservation Zone. No rubbish should be allowed to be deposited or accumulate there.
 - No new below ground structures such as swimming pools, service installations and the like shall be permitted within the Conservation Zone.
 - Surface paving of any type, within the Conservation Zone, shall be restricted to simple access pathways. No vehicle accommodation, movement or parking areas shall be permitted. Vertical tracks up the slopes should be avoided; instead, winding paths gently crossing the contours should be developed. The existing house located on Lot 12 may be retained and continue in private residential use. No additions or extensions to the above built envelope of the existing house shall be permitted. The eastern, southern and western sides of the house and its immediate surroundings shall be visually screened with close planted vegetation.
 - The erection of a single storey house at the north eastern corner of the ridge-line on Lot 11 by the current land owner is permissible but shall be subject to careful design and siting to minimise any physical impact on the Aboriginal or Historical Archaeological resources.
 - The visually open grassland nature of the Conservation Zone shall be retained and protected, without significant changes to the existing topography. Bright green lawns and swimming pools should be avoided. Hardy native grasses should be fostered. These can be controlled by slashing after seeding and/or by grazing a few animals (horses, cows, sheep, etc.)
 - Planting of trees or other vegetation within the Conservation Zone shall be restricted to individual specimens or visually open groupings of endemic native vegetation (principally eucalypts, casuarinas and wattles) and then only as individual specimens or clumps of two or three. Trees that have a relatively clear trunk and high canopy are preferred over visually bulky specimens. The planting of visually dense hedges of any variety is not permitted. No ornamental trees and hedges (especially not of cypress) are permitted within the Zone.
 - External lighting within the Conservation Zone shall be limited in extent to that required for public or private safety and shall be mounted no higher than 1500mm from natural ground level.
- Development Guidelines for land within the proposed Open Space Conservation Zone (grey area) include:
 - A portion of elevated land at the north eastern corner of Lot 12, being the high ground extension of the Open Space Conservation Zone, shall be reserved for public open space or common ownership with public pedestrian access, in recognition of its important outlook characteristics within the Historic Cultural Landscape. This area, which should be accessed from either the lower, riverside portion of the Open Space Conservation Zone or along the Hawkesbury Street alignment, shall be one of the primary locations for public interpretation media.
 - The existing open landscaped nature of the low-lying land shall be retained and enhanced.
 - There should be a public pathway loop through the Open Space Conservation Zone to link the high ground outlook at the northern end of Hawkesbury Street with the public parking area at the northern of

Punt Road. This pathway should be located and designed to minimise privacy loss into the existing house on Lot 12 or any new houses located to the south of the Conservation Zone.

- The public pathway may extend into any open space along the river frontage that is developed on the adjoining lots to the east of Lot 12.
- Public interpretive media shall be sensitively located in key positions adjacent to any pathway network through the Open Space Conservation Zone.
- Planting of trees or other vegetation within the Open Space Conservation Zone shall be restricted to
 individual specimens or visually open groupings of endemic native vegetation (principally eucalypts,
 casuarinas and wattles) and then only as individual specimens or clumps of two or three. Trees that have
 a relatively clear trunk and high canopy are preferred over visually bulky specimens. The planting of
 visually dense hedges of any variety is not permitted. No ornamental trees and hedges (especially not of
 cypress) are permitted within the Zone.
- Surface paving shall be restricted to a limited network of pathways, cycleways or some emergency access
 routes and to a limited area of public parking near the Punt Road frontage of the Zone. Any separate
 emergency vehicle access routes shall be unpaved and coordinated with the pedestrian track network to
 minimise visual intrusion. Vertical tracks up the slopes should be avoided; instead, winding paths gently
 crossing the contours should be developed.
- Above ground structures shall be limited to the provision of a single set of public amenities, which shall be sited and designed to minimise visual intrusion into the key outlooks and viewing cones from the higher ground within the Conservation Zone and in particular that area adjacent to the northern extension of Hawkesbury Street.
- External lighting within the Open Space Conservation Zone shall be limited in extent to that required for public or private safety and shall be mounted no higher than 1500mm from natural ground level. If higher light sources are required for public safety, the design and location of any poles shall minimise visual disruption to the Historic Cultural Landscape.

The Conservation Zone guidelines will be implemented through a combination of the planning controls contained in the NSW Heritage Act and the Hawkesbury LEP, supported as appropriate by either Voluntary Conservation Agreements, covenants or Heritage Agreements over the individual land parcels.

Standard Voluntary Conservation Agreements or Heritage Agreements will be established between the relevant agencies and the principal developer of the land, prior to the sale of any individual subdivided lot. The relevant agreement will then be incorporated into the property documentation at the time of sale.

6.2.2.3 Further Protection Measures

In order to ensure that the heritage values of the site are protected during construction and in the longer term, the proponent has also included the following commitments in their revised Statement of Commitments:

- "The proponent is to pursue the establishment of a Voluntary Conservation Agreement (VCA) or similar form of protection over the Conservation Zone (Public Ownership) and Open Space Conservation Zone (Private Tenure) within Blighton Precinct, including measures to protect the identified Aboriginal, Historical Archaeological and Historic Cultural Landscape values.
- The proponent is to nominate the land within the Voluntary Conservation Agreement (VCA) over the Conservation Zone (Public Ownership) and Open Space Conservation Zone (Private Tenure) to NSW Heritage Council for inclusion on the NSW State Heritage Register and for inclusion as a Heritage item on the Hawkesbury LEP.
- Prior to obtaining a Construction Certificate for development within any precinct containing known
 archaeological artefacts, the proponent is to undertake any required archaeological salvage works in
 accordance with Section 90 of the National Parks and Wildlife Act 1974 (Amended 2001) and/or the
 Heritage Act 1977 and generally in accordance with the relevant AHMS reports.
- An archaeological assessment and impact assessment should be undertaken as part of the documentation for the Cattai Precinct Development Application.
- Prior to Development Approval for Blighton Precinct, the proponent is to prepare and submit for approval a Heritage Interpretation Plan that communicates the complementary and overlapping Aboriginal and Historic heritage values of the land to the public and to those who will live in close proximity to the land."

Planning Comment

The NSW Heritage Office is concerned that the lot layout proposed in the concept plan for Blighton has not been amended from earlier proposed layouts (as discussed with the Heritage Office prior to the lodgement of the Part 3A application) to reduce the number of lots bordering on the western boundary of Blighton, facing the historically significant area known as the Pitt Town Bottoms. The Heritage Office has requested that the 6 lots proposed in this area be amalgamated into 3 larger lots, with the aim of maintaining the open vista of land that was formally part of Governor Bligh's Farm. The sketch below (**Figure 9**) illustrates a subdivision pattern acceptable to the Heritage Office, which was provided to JPG prior to lodgement of the concept plan, but has not been adopted.



Figure 9. Heritage Office Sketch - Consolidation of Lots in Blighton

Unless the previously requested mitigation measures are included in the subdivision layout, the Heritage Office is concerned that the proposal will have a significant adverse impact on the heritage significance of the Pitt Town Bottoms cultural landscape, which is under consideration for listing on the State Heritage Register. The Department considers the Heritage Office suggestions to be reasonable and appropriate in this instance as they will ensure the open vista of land that was formally part of Governor Bligh's Farm is maintained when viewed from the Pitt Town Bottoms, and a modification to the concept plan approval has been recommended accordingly requiring the 6 lots to be amalgamated into 3.

DECC has raised concern over various measures detailed in the EA and Statement of Commitments (SoC) relating to the preservation of Aboriginal heritage. In response, the proponent has amended their Statement of

Commitments in their preferred project report accordingly. The revised SoC require the proponent is to pursue the establishment of a Voluntary Conservation Agreement (VCA) or similar form of protection over the Conservation Zone (Public Ownership) and Open Space Conservation Zone (Private Tenure) within Blighton Precinct (refer to **Figure 9**), including measures to protect the identified Aboriginal, Historical Archaeological and Historic Cultural Landscape values. The proponent is also to nominate the land within the Conservation Agreement (VCA) over the Conservation Zone (Private Tenure) to the NSW Heritage Council for inclusion on the NSW State Heritage Register and for inclusion as a Heritage item on the Hawkesbury LEP.

Further, prior to obtaining a Construction Certificate for development within any precinct containing known archaeological artefacts, the proponent is to undertake any required archaeological salvage works in accordance with Section 90 of the National Parks and Wildlife Act 1974 (Amended 2001) and/or the Heritage Act 1977 and generally in accordance with the relevant Archaeological & Heritage Management Solutions (AHMS – consultant archaeologist) reports.

6.2.3 Flooding – Emergency Evacuation & Climate Change

6.2.3.1 Emergency Evacuation

Concern has been raised in public submissions about the flood risk associated with siting residential development adjacent to the Hawkesbury River.

Molino Stewart has assessed the impacts of the development and a copy of the Molino Stewart report is attached as Appendix K to the EA. Molino Stewart concluded that the proposed 943 lot residential development in Pitt Town:

- Is consistent with the NSW Government's Flood Prone Land Policy as set out in the NSW Floodplain Development Manual, 2005;
- Will be above the 1 in 100 flood level, mostly above historical flood levels and some will even be above the PMF which means that the risks of flooding to the proposed properties would be tolerable and in accordance with the principles set out in the NSW Floodplain Development Manual;
- Is a land use and development type which is consistent with the flood risk;
- Will not take up significant flood storage capacity or create significant obstructions to flood flows and so will
 not significantly increase flood risks for existing properties in Pitt Town or elsewhere on the floodplain;
- Can be safely evacuated along with the existing Pitt Town community in the available time for the full range of floods when modelled using the SES evacuation timeline modelling;
- Will reduce the surplus evacuation time available for Pitt Town from three hours to a little under half an hour;
- Can be evacuated in a manner which integrates with the existing SES evacuation strategy for the area;
- Will not interfere with the evacuation of existing developments elsewhere;
- Can easily evacuate to a high point within Pitt Town above the PMF should residents be unable or unwilling to evacuate before the evacuation route out of Pitt Town is cut;
- Will require temporary accommodation for its residents should they be evacuated but that the additional 3,000 persons should be able to find such accommodation somewhere in Sydney;
- Will not increase risk to life elsewhere on the floodplain; and
- Will require an additional 22 emergency service personnel to undertake doorknocking in Pitt Town which the NSW SES has previously indicated can be provided.

Planning Comment

In large floods, Pitt Town becomes isolated and accordingly the NSW State Emergency Services (SES) has devised an evacuation plan for the area. In their letter to the Department dated 7 November 2007 relating to the JPG concept plan proposal (refer yellow Tag B), the SES has advised that up to 1,100 additional lots can be developed at Pitt Town without major flood evacuation route upgrades. The 893 net additional lots proposed by the JPG concept plan and LEP 145 are achievable within the SES limit.

The current proposal will result in rezoning of some land for residential development below the 100 year flood level, although all lots contain some developable land above the 100 year flood level. It is intended that all dwellings be located above the 100 year flood level of 17.3m (reinforced through covenants to be included in s88B instruments) and all proposed lots have sufficient area to comply with this requirement. Clause 25 of

Hawkesbury LEP also restricts the construction of buildings on flood prone land, requiring that all habitable rooms have a floor level no lower than the 1-in-100 year flood level for the area in which the land is located.

Most of the land lying below the 100 year flood level to be rezoned is along the northern fringe of the site where relatively long lots have been designed to extend down the escarpment above the river flats. These lots will adjoin the proposed open space and will form a soft edge to urban area. All lots have been provided with access above the 100 year flood level to ensure that residents can evacuate safely, away from approaching flood waters. The limit of the 100 year flood, and therefore the land available for building envelopes is shown in the master plan drawings for Blighton, Cleary and Thornton at **yellow Tag A**.

6.2.3.2 Climate Change

The primary objective of the NSW Government's Flood Prone Land Policy is to reduce the impacts of flooding and flood liability on individual owners and occupiers of flood prone property and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible. This objective needs to consider that flood prone land is a valuable resource that should not be sterilised by unnecessarily precluding its development and that a merit based approach to decision making is necessary rather than rigid and proscriptive criteria.

The impacts of climate change on sea levels and flood producing rainfall events will have a flow on effect on flood behaviour which may result in key flood levels being reached more frequently and floods of the same average recurrence interval, ARI, being of a larger magnitude. However, the climate change factors influencing flood behaviour and their ramifications to the community will vary with the location, and the scientific evidence forecast regime is not certain.

DECC has released a Guideline on the *Practical Consideration of Climate Change* to assist in further understanding the risk posed by climate change.

Planning Comment

The proponent provided the Department with a supplementary report from Molino Stewart on 20 May 2008 on potential impacts of climate change on flooding in the Hawkesbury Nepean Valley and the possible implications for the proposed residential development at Pitt Town. The assessment has been based on the relevant DECC guidelines.

The report found that both sea level and increased rainfall intensity could theoretically change flood levels and rates of rise at Pitt Town. While future increases in sea level (0.91m) over the next hundred years are unlikely to have a significant impact on flooding at Pitt Town, a 10% increase in rainfall intensity could make today's 1 in 200 level about a 1 in 100 event by the end of the century – i.e. the 1 in 100 level would rise from the current 17.3m AHD to about 18.7m AHD, a rise of 1.4m.

Evacuation is currently triggered if flooding is expected to exceed 16m AHD. This currently has about a 1 in 50 chance of occurrence in any year. With a 10% increase in rainfall intensity this might become about a 1 in 30 chance of occurrence per year. In other words, climate change may make evacuation more probable but it would still be something that is not likely to occur more than two or three times in a lifetime, much as it is now.

Molino Stewart have suggested that while climate change may make the floods which would reach Pitt Town rise faster than in the past, SES evacuation planning is based around the rate of rise of the PMF and currently there is no suggestion that this rate of rise will increase. Similarly, the peak of the PMF is not predicted to increase so should people fail to evacuate there would still be part of Pitt Town remaining above the floodwaters as a refuge.

Therefore, the only significant implication of climate change on the proposed development is a potential increase in the 1 in 100 flood level from 17.3m AHD to 18.7m AHD. Refer to yellow **Tag C** at the end of this report for plans for each of the JPG precincts with the 18.7m flood line (red) shown adjacent to the 17.3m flood line (blue).

From the contour plans it is clear that the ability to construct houses on lots within the Blighton, Bona Vista and Fernadell Precincts will remain largely unaffected by the impacts of climate change and the rise in the 1 in 100 flood level to 18.7m. However, the development potential of lots within the Cleary Precinct and the northern portion of the Thornton Precinct will clearly be reduced if current ground levels are maintained.

The following development options were recommended for consideration by Molino Stewart for future applications for houses in the Pitt Town subdivision (particularly within the precincts most affected by flooding – i.e. Cleary and Thornton):

- Carry out local earthworks and fill land upon which homes are to be built to 18.7m AHD if it is currently below that level; or
- Build raised buildings with minimum floor levels at 18.7m AHD; or
- A combination of fill and raised floor levels such that minimum floor levels will be somewhere between 17.3m AHD and 18.7m AHD. Those parts of the buildings below 18.7m AHD should be built of flood resistant materials and the buildings be two storeys to reduce the risks from climate changed induced flood damages.

A fourth scenario would obviously be to not have any residential development within the north of the Cleary and Thornton Precincts, below the 18.7m contour.

However, it is critical to note that the flood scenario contemplated above is at the upper end of the current climate change forecasts and some modelling suggests that in the Hawkesbury Nepean the intensity of rainfall may actually decrease. Furthermore, according to Molino Stewart all models are forecasting increased evaporation in the catchment (by as much as 24%) which in turn could reduce the amount of water in the Warragamba and the Upper Hawkesbury dams immediately prior to a flood which would reduce the flood levels further. Therefore, the predicted 18.7m flood level is very much a 'worst case' scenario, with an occurrence of 1 in 100 years by the end of this century.

The Department is of the view that the combination of fill and raised floor levels to 18.7m AHD for houses within the north of the Cleary and Thornton Precincts is a viable option for responding potential flood levels caused by climate change, without creating flow-on environmental or amenity impacts in the precincts. The northern portions of these precincts are not readily visible from the Pitt Town Bottoms as they are screened by the higher topography of the Blighton Precinct, as detailed in section 6.2.5 of this report. Also, examples of raised housing design can be already found in the Pitt Town locality. However, whether it is appropriate to allow two storey houses in this location will be determined in the formulation of the design guidelines, as will the amount of fill permitted within the building footprint.

A modification to the concept plan approval is recommended requiring that this design issue be addressed in the formulation of new residential design guidelines for Pitt Town, which will replace the existing DCP controls.

6.2.4 Lot Size & Layout

Various public submissions have raised concern over the proposed reduction in lot sizes in the concept plan compared with LEP 145. Principally, LEP 145 allows a minimum lot size of 750m² in the Bona Vista and Fernadell Precincts, while the JPG concept plan (and associated LEP amendment) proposes minimum lot sizes for part of the Bona Vista Precinct of 650m² and 550m² for the entire Fernadell Precinct, which is located directly adjacent to the existing Pitt Town village. There is some concern that the smaller lot sizes and greater density of development is contrary to the existing semi-rural character of the locality.

Planning Comment

The lot sizes proposed in Fernadell and Bona Vista are generally consistent with those in the existing village, where lots are as small as 520m². Smaller lots are located closer to the village while larger rural housing lots are located along the northern fringe of the urban area providing a transition to the village. The curtilage and densities around the historically significant Bona Vista homestead (which is outside the concept plan area) remain unchanged from LEP 145.

6.2.5 Visual Impacts

As discussed in Section 6.2.2 of this report, part of the concept plan area is readily viewable from the Pitt Town Bottoms as the western portions of the Blighton, Bona Vista and Fernadell Precincts sit along a ridgeline (adjacent to Bathurst Street). The Heritage Office has raised concern over the potential visual impact of the development, and particularly the southern western corner of Blighton when viewed from the Pitt Town Bottoms.

Planning Comment

The heritage and urban design analysis provided as part of the EA identified two categories of important views:

- · Major outward views from elevated land over the low lands of the Hawkesbury River; and
- Major inward views toward elevated land from the low lands of the Hawkesbury River, including Pitt Town Bottoms.

Photographs of the Pitt Town concept plan area can be seen in Appendix R of the EA, however a summary of the key views can be seen in the sequence below.



Looking across the Hawkesbury River towards the Blighton Precinct from Pitt Town Ferry Road, on the northern side of the river. Note the recently constructed residence on the ridge within Lot 12 at the left of the picture, and the gentle fall of the ridge to the west (right). Also note that the proposed boat ramp will be located where the vehicle is parked on the right of the picture.



The junction of the northern end of Punt Road with the Hawkesbury River - site of the proposed boat ramp facility.



View from within the rear of the Blighton Precinct, looking north-west along the River. The site of the boat ramp can be seen in the distance.



View from Pitt Town Bottoms Road across Pitt Town Bottoms showing the Pitt Town ridge at the centre and far right of the image.



View north along Punt Road, from its junction with Hall Street. Lot 11, the western half of the Blighton Precinct, is on the right of the image. This is the area of primary concern to the NSW Heritage Office, where they requested that 6 lots be combined to form 3 larger lots facing the Pitt Town Bottoms.



Further view of the south-western corner of the Blighton Precinct.

The conclusions drawn in the EA from these views and analysis are that:

- It is critical that the land in the Pitt Town Bottoms remain in a rural zoning to protect the scenic character of the area.
- Houses on the western parts of the elevated land within the concept plan area (i.e. Blighton, Bona Vista and Fernadell Precincts) need to be visually buffered. That is, houses along Bathurst St need to be screened by trees.
- Houses on the northern parts of the elevated land (i.e. Blighton Precinct) should not be located below the upper parts of the elevated land and that there should be landscape and fencing style controls to ensure compatibility with the open rural character of the lowlands and slopes.

Visually sensitive areas within the concept plan area essentially derived from the heritage values of the area which include: the Bona Vista homestead and its curtilage; Blighton historical area; early circulation roads (Johnston, Hall and Bathurst, Hawkesbury St and Bootles Lane); and historical rectilinear farm lot pattern and fence line pattern.

The development considerations arising from the scenic landscape assessment for each major property holding, as described in the submitted EA, are detailed below.

Bona Vista & Fernadell Precincts

The increased density within the Fernadell and Bona Vista properties will have acceptable impacts on the scenic and visual quality of the area because:

- All of the development except for the Bathurst St frontage is visually separate from the visually sensitive catchment of Pitt Town Bottoms and the northern side of the Hawkesbury River. The smaller lots are screened from external views.
- The Bathurst St frontage responds appropriately to the visually sensitive catchment by:
 - > Retention of the existing Casuarina trees in the existing street reservation.
 - > Location of larger lots along Bathurst St with access denied to new lots fronting Bathurst Street.
- Within the development area the proposed increase in density responds appropriately to visually sensitive areas by the:
 - > Larger lots proposed along the historical roads of Johnston Street;
 - > Retention of the curtilage around Bona Vista homestead and buildings;
 - > Retention of the park adjacent the Bona Vista homestead; and
 - > Retention of the rectilinear street layout pattern.

Thornton Precinct

The increased density within the Thornton property will have acceptable impacts on the scenic and visual quality of the area because little or none of the development can be seen from the visually sensitive catchment of Pitt Town Bottoms.

Blighton and Cleary Precincts

The potential scenic and visual quality impacts associated with the increased density north of Hall Street are partially mitigated by the following design measures incorporated into the concept plan design:

- > Larger lots are located along the historical roads of Hall Street and Punt Road;
- > The houses edging the elevated land cannot build below RL 17.3m AHD;
- > The houses edging the elevated land are to have landscape and fencing style controls (open style
- rural fencing) for their lots extending northwards down the slope; and
- > The proposed open space on the low land is consistent with the existing open landscape character.

As detailed earlier in this report, the NSW Heritage Office is concerned about the lot layout proposed in the south western corner of the Blighton Precinct. The Heritage Office has requested that the 6 lots proposed in this area be amalgamated into 3 larger lots, with the aim of maintaining the open vista of land that was formally part of Governor Bligh's Model Farm. A modification to the concept plan approval has been recommended accordingly requiring the 6 lots to be amalgamated into 3 larger lots. This will have a positive impact on views of the site from the west and will lesson the visual impact of development in this area. Consideration should also be given to restricting houses within the Blighton Precinct to single storey.

Subject to the suggested design measures being incorporated into the proposal, in combination with the Department's proposed modifications to the concept plan, it is considered that the increased density facilitated by the concept plan would not result in any unacceptable scenic and visual quality impacts in the area north of Hall Street.

Mitigation Measures – Statement of Commitments

The Proponent has incorporated the following mitigation measures in their Statement of Commitments to further address issues associated with the visual impact of the proposed subdivision:

"Future applications for Bona Vista and Fernadell Precincts are to include:

- Retention of the existing Casuarina trees in the existing street reservation;
- Location of large lots along Bathurst St with access denied to new lots fronting Bathurst Street;
- Larger lots along the historical roads of Johnston Street;
- Retention of the curtilage around Bona Vista homestead and buildings;
- Retention of the park adjacent the Bona Vista homestead; and

• Retention of the rectilinear street layout pattern.

Future applications for **Blighton** and **Cleary Precincts** are to include:

- Larger lots are located along the historical roads of Hall Street and Punt Road;
- The houses edging the elevated land cannot build dwellings with finished floor levels below RL 17.3m AHD; and
- The houses edging to elevated land are to have landscape and fencing style controls (open style rural fencing) for their lots extending northwards down the slope."

6.2.6 Biodiversity

DECC has raised concern over the location of a stormwater "detention basin" adjacent to the corner of Johnston Street and Bootles Lane, where the endangered ecological community (ECC) Shale Transition Forest currently occurs. DECC is also concerned about the lack of ecological corridors to link flora and fauna corridors both on and adjoining the site.

Public submissions have also raised concern over the loss of existing flora and fauna in Pitt Town as a result of the proposed subdivision.

Planning Comment

An area of vegetation to the south-east of Bona Vista Precinct (outside the JPG concept plan boundary but on land owned by JPG) is identified as being of high ecological value and considered to meet the criteria for Shale Gravel Transition Forest (ECC). The area also contains several *Acacia pubescens*. No other threatened species or endangered ecological communities have been identified in the Pitt Town concept plan area.

It is important to note that the footprint of the JPG concept plan area in the Bona Vista Precinct is identical to the footprint of LEP 145, meaning that this issue was largely dealt with during the formulation of LEP 145.

A bio-filtration basin is proposed in the preliminary Stormwater Management Plan prepared by Browns Consulting (Appendix L in the EA) in the south east corner of the Bona Vista Precinct, in accordance with Council's DCP and S94 plan for Pitt Town, but is located so as not to require clearing of any native vegetation. The bio-filtration basin will include provisions to minimise the transport of weeds and sediment, further details of which will be provided as part of a future application for this area.

Within the Blighton, Cleary and Thornton Precincts a 45 metre wide buffer riparian zone will be retained adjacent to the Hawkesbury River from the top of the river bank and in addition, no development will be permitted within the proposed lots for a further 45 metres (due to flooding constraints), thus providing a total setback in excess of 90 metres. This will help protect the River and local native fauna from the direct impacts (e.g. bank erosion) and indirect impacts (e.g. weed invasion, sediment and excessive water runoff) of the proposed subdivision.

The 45 metre buffer area is also proposed to be opened up to the public, incorporating a constructed 'river walk', and potentially dedicated to Council, with landscaping and maintenance costs initially funded by the developer. In this regard, the following Statement of Commitment has been proposed by the proponent regarding the establishment of a river walk:

"Prior to development approval of the Blighton, Cleary and Thornton precincts, JPG will use its best endeavours to negotiate with Council in good faith for the transfer to Council of the Blighton Riverside Park Land in a manner which secures public ownership of the Blighton Riverside Park Land and its care and maintenance.

If such an agreement between JPG and Council cannot be reached, then the Developer will retain the land in private ownership, but on the basis that it is fully accessible to the public and adequately cared for and maintained."

Canopy trees on other parts of the concept plan area will be retained were possible, which will serve to act as a visual buffer particularly when viewing the site from the Pitt Town Bottoms.

Therefore, the likely impacts on existing flora and fauna of the proposal are considered minimal.

6.2.7 Traffic & Pitt Town Bypass

Concern has been raised in public submissions about potential increases in traffic on existing streets as a consequence of the proposed development, and highlighted the need for the Pitt Town Bypass road to be constructed.

Planning Comment

The EA has been accompanied by a traffic report from Masson Wilson Twiney (MWT), Traffic and Transport Consultants, which assess the external and internal road network implications of the proposed JPG concept plan.

The Traffic and Transport Assessment (MWT, July 2006) considered the traffic and transport implications of development of some 1,250 additional residential lots within the Pitt Town Investigation Area, which was the total number of new lots being proposed for Pitt Town by JPG at the time. This figure has now been reduced to 943 lots (including 50 existing lots).

External Road Network Traffic Implications

The analysis considered the implications of the development potential to the regional and local road networks. The traffic and transport analysis (MWT, July 2006) assessed a package of external road network improvement works identified by the RTA and the Pitt Town TMAP 2005 with regard to a 1,250 lots scenario and the relative funding contributions for works by future development potential. This assessment concluded that the package of external works would provide sufficient capacity to satisfactorily accommodate the transport demands of an additional 1,250 residential lots.

An agreement between Johnson Property Group and the RTA has been developed with regard to contributions towards the implementation of the package of external transport infrastructure works. The agreement was prepared on the basis of the RTA's preference for funding and construction of whole projects in order of priority. As such the Johnson Property Group's contribution for each of the individual elements identified in the package of works were identified, totalled and then allocated whole projects in accordance with the RTA's priorities and staging requirements.

The agreement included 100% contribution by the Johnson Property Group of the following works:

- > Upgrade to Pitt Town Road shoulders; and
- > Upgrade to Pitt Town Road intersections (5).

The construction of the Pitt Town Bypass was not included in the RTA agreement as works to be constructed or funded by the Johnson Property Group. However, in a submission to the Department dated 27 March 2008 on the proposed JPG concept plan, the RTA has commented that based on recent traffic modelling it is now appropriate that JPG be required to contribute towards the construction of the Pitt Town bypass. As detailed earlier in this report, the section 94 plan for Pitt Town has been amened to include funding of approximately half of the costing for the Pitt Town Bypass. The remainder would be funded through Regional Infrastructure Contributions from development of land not yet subject to a voluntary planning agreement.

Internal Road Network Implications

The internal road network proposed as part of the concept plan application reflects the internal road layout and road hierarchy as defined by the Pitt Town DCP. The proposed subdivision road layout is essentially a grid based system which will facilitate permeability for road users including private vehicles, emergency vehicles, cyclists and pedestrians. The proposed hierarchy would reflect the local amenity considerations including sensitive road frontages as defined in the DCP.

The internal road layout would facilitate the provision of:

- > local bicycle route connections to the regional cycle network
- > local bus routes with connections to Windsor and Mulgrave train stations.

As defined by the Pitt Town DCP the existing on-road local cycle path along Bathurst Street is to be upgraded/ better defined and extended through Pitt Town along the route indicated on the Pitt Town Development Plan. The cycle path will consist of a 2 metre wide section of the road pavement for two-way movement marked by a single white line painted on the road pavement. Other local streets will be low speed shared zones for cyclists and motorists with no line markings provided. Contributions for these works are defined in the relevant Section 94 plan.

Both the local bus and bicycle routes through Pitt Town are identified by the Pitt Town DCP. The proposed development as represented in the concept plan would facilitate the provision of both the local bus and bicycle routes.

6.2.8 Stormwater & Overland Flow

Concern has been raised from DECC and Council and in public submissions regarding stormwater runoff/overland flow and impacts on existing waterways.

Planning Comment

A Water Cycle report has been submitted in support of the JPG concept plan, which proposes a series of detention facilities, similar to that proposed for development under LEP 145 and detailed in Hawkesbury DCP and the adopted Pitt Town Water Management Plan, so that the objectives of the Hawkesbury DCP can be achieved. All stormwater will receive treatment so as to meet the water quality requirements of the DCP.

The treatment of the stormwater runoff is proposed by a combination of Gross Pollutant Traps (GPT), swales, wetlands and bioretention basins. In all but major storms, runoff will be directed into one of the water quality basins. All lots will be connected to the sewerage system, which will be designed to Sydney Water standards. Weeds will be trapped in the wetlands, swales and/or the bioretention basins and may be harvested at regular intervals to prevent their uncontrolled spread.



Figure 10 below shows the proposed water quality and detention facilities.

Figure 10. General Layout of Detention and Water Quality Facilities

The stormwater management system will obviously develop in greater detail as development applications are lodged for each stage of the subdivision. This may lead to alterations or refinements to the concept shown in Figure 11. It should also be noted that the Water Cycle report makes reference to the possibility of using the Fernadell playing fields as a storage facility for detention purposes in combination with a basin. The intention is that the playing fields will be used as secondary storage area with only minor ponding of water to occur in this

area. This is not considered ideal as sporting fields are in short supply in the Pitt Town area and they should still be able to be used in times of moderate to high rainfall. This has also been raised as an issue by Council. Further, the revised section 94 plan for Pitt Town is proposing acquisition of a slightly larger area of open space in Fernadell (than detailed in the current Pitt Town DCP) to accommodate a third field directly south of the two already planned.

It is clear then that this area will form a major recreation point for residents of Pitt Town and should remain flood free where possible. A modification is therefore recommended in any concept plan approval requiring a redesign of the stormwater detention system, removing the proposed detention basin from the northern half of the Fernadell open space area where three sporting fields will be located in the future. The proponents have indicated that is able to be achieved.

In their Statement of Commitments, the proponent has also given an undertaking that they will negotiate with the Department of Water and Energy (DWE) in relation to the preparation of plans for development of land adjacent to the watercourse in Thornton Precinct.

6.2.9 ESD Principles

There are five accepted ESD principles:

- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the integration principle);
- (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the precautionary principle);
- (c) the principle of inter-generational equity that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the inter-generational principle);
- (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making (the biodiversity principle); and
- (e) improved valuation, pricing and incentive mechanisms should be promoted (the valuation principle).

The Department has considered the redevelopment in relation to the ESD principles and has made the following conclusions:

- Integration Principle The social and economic benefits of the proposal are well documented. The
 environmental impacts are and will be addressed through the proponent's Statement of Commitments.
 Additionally the environmental impacts will be assessed as future applications are. The Department's
 assessment has duly considered all issues raised by the community and public authorities. The proposal as
 recommended for approval does not compromise a particular stakeholder or hinder the opportunities of
 others.
- **Precautionary Principle** Following an assessment of the proponent's EA it is considered with certainty that there is no threat of serious or irreversible environmental damage as a result of the proposal.

The extensive range of studies into flooding and stormwater management, climate change, flora and fauna impacts, bushfire threats and Aboriginal cultural heritage have not revealed any uncertainty regarding potential impacts. Impacts identified can be appropriately managed and have not been found to result in serious or irreversible environmental damage as a consequence of this proposal. In contrast, the findings and recommendations of the flora and fauna report have identified opportunities that will improve the environmental attributes and qualities of the site, particularly in relation to the riparian corridor beside the Hawkesbury River, that would not otherwise be realised without redevelopment and the elements incorporated into this concept plan. The findings and recommendations of the range of specialist studies have not revealed the need to adopt the precautionary principle from an ecological point of view to either delay or prevent the concept plan application from proceeding.

 Inter-Generational Principle – It is considered that the development of this site will have positive social, economic and environmental impacts and as a result will maintain the environment for the benefit of future generations. The concept plan has taken into consideration a range of issues and impacts which are to be addressed in the design and construction of the proposed residential development to ensure that the proposal does not impose a burden on future generations. In particular stormwater management, water quality measures, bushfire management, traffic management and pedestrian and cycleway networks are all integrated into the design of the concept plan to ensure that these are delivered as part of the project. The existing Planning Agreement sets out how and when some of these public benefits are to be provided by the development. The proposal also delivers benefits such as provision of open space alongside the Hawkesbury River, through which pedestrian pathways and cycleways can be constructed in the future that will provide a benefit and right of access to the River for the benefit of future generations. Heritage conservation is also an important component of the development, with importance placed on the historical connections of Pitt Town to the early settlement of Sydney, for the appreciation and education of future generations.

• **Biodiversity Principle** – Following an assessment of the proponent's EA it is considered with certainty that there is no threat of serious or irreversible environmental damage as a result of the proposal.

This EA has demonstrated how the relationship of the biophysical elements of the site has been considered in the development of the concept plan to minimise potential impacts. In particular this EA demonstrates how:

- flood evacuation can be managed without adversely impacting upon the safety of the future or existing residential areas;
- stormwater is managed to control water quality;
- flora and fauna attributes of the site are not adversely affected and improved where possible with the establishment of riparian corridors;
- bushfire risks can be appropriately managed having regard to existing and proposed vegetation characteristics of the site;
- land use constraints of past uses and potential for contamination can be managed without compromising the future capacity for residential development; and
- cultural heritage can be addressed.

In addition the EA demonstrates how potential impacts arising from the physical aspect of the proposed development such as traffic management, built form and visual amenity of the proposed residential development are acceptable. Future residential development within the Pitt Town subdivision will also be required to comply with BASIX, which aims to deliver good design, energy and water efficiency.

 Valuation Principle – It is difficult to assign a monetary value to the environment of a locality, or environmental resources not exploited for commercial use. A monetary value could not be placed against the greatest proportion of environmental attributes of the site which may be affected. The more appropriate approach adopted for this project is to manage environmental impacts by identifying appropriate safeguards to mitigate adverse environmental impacts. This cost of implementing these safeguards is included in the total project cost as a means of pricing the protection of the environmental attributes of the site.

Further assessment of ESD principles will be undertaken during subsequent project application stages of the proposal.

6.2.10 Design Guidelines & Hawkesbury DCP

Council has raised concerns over the DCP amendments proposed by JPG for Pitt Town. Council's concerns are outlined below:

"The current proposal seeks the replacement of the current 'effective' Development Controls for Pitt Town (Part E of Hawkesbury DCP), including the Development Plan, road layout and dwelling requirements. Extensive consultation was carried out with both government agencies and the community in the preparation of the Pitt Town Chapter of the DCP and Amendment 145. Significant work was carried out to ensure that the conservation value of Pitt Town was protected and enhanced. This work involved representatives from the NSW Heritage Office, Johnson Property Group and Council officers.

Further, support from the NSW Heritage Office for Amendment 145 to Hawkesbury LEP 1989 was conditional, based on both the LEP and DCP including provisions to ameliorate the likely impact of the residential subdivision on Pitt Town cultural heritage significance. The current application seems to be contrary to the previous advice received from the Heritage Office and Department of Planning during the preparation and adoption of Amendment No. 145.

The proposed amendments to the DCP do not adequately address or manage the impact of the development on the historical significance of Pitt Town."

It is proposed by JPG that the DCP be modified to incorporate "Design Guidelines" for future housing. Example Guidelines for a $750m^2$ lot, including a comparison to the current DCP requirements, are attached as Attachment G in the Preferred Project Report. It is proposed to develop controls for all lot sizes, with variations to account for the requirements of each type of lot.

Other elements of the DCP required to be amended to accommodate the proposed development include:

- Amending the boundary of the Pitt Town Residential Precinct as proposed in this EA. This will involve replacing Figures 4.1, 4.2, 4.3, 4.4 and 4.11 of the DCP;
- Amending the density controls and lot sizes to correspond with the development as proposed in this EA. Table E4.1 will require to be replaced;
- Amending Figure E4.12 of the DCP to show the proposed configuration of the Community Centre; and
- Amending the site coverage, set back provisions and building details of the DCP for the full range of proposed lots.

Planning Comment

The development controls (site coverage; front, side and rear setbacks; height) proposed by JPG represent a significant relaxation of the controls currently in Hawkesbury DCP for Pitt Town. For example, for lots with an area of $550m^2$ to $1000m^2$, JPG are proposing to allow a total site coverage of 60%, while for $750m^2$ lots the DCP currently only allows a site coverage of 45%. JPG have also grouped the lots sizes into two categories when applying their development controls ($550m^2$ to $1000m^2$; and lots > $1000m^2$), where it would be more appropriate to formulate specific development for each lot size proposed in the concept plan – i.e. $550m^2$, $650m^2$, $750m^2$, $1000m^2$, $2000m^2$, $2500m^2$, $4000m^2$ and $10,000m^2$. This is the approach currently taken in the DCP.

It appears that the proposed JPG development controls have been tailored around particular housing types rather than the controls informing the future design of the houses within each precinct. This is not considered appropriate due to the large variance with the development controls currently contained in the DCP and lack of consideration given to the existing character and historical significance of the locality.

Whilst the Pitt Town chapter of the Hawkesbury DCP will eventually need to be amended by Council as a consequence of this concept plan (as currently it does not contemplate lot sizes below 750m²), in the short term it would be more appropriate for the proponents to engage in further consultation with Council and the Department of Planning on suitable development control guidelines for the lots sizes proposed which can be incorporated into the concept plan approval.

In this regard a modification is recommended deleting the JPG design guidelines (*Attachment G* in the Preferred Project Report) from the concept plan approval and requiring further consultation with Hawkesbury Council and the Department in order to determine suitable development controls for Pitt Town, for endorsement by the Department.

6.2.11 Project Justification and Public Interest

The JPG concept plan and accompanying Environmental Assessment has considered the range of environmental impacts and other assessment requirements identified in the Director General's Requirements, and is considered to be in the public interest as follows:

- Density the proposed increase in residential densities is considered appropriate given the capacity of land surrounding the existing Pitt Town village and that local and regional infrastructure will be provided via an amended section 94 plan and planning agreement. Smaller lots are located closer to the village while larger rural housing lots are located along the northern fringe of the urban area providing a transition to the village.
- River Foreshore and Public Access the concept plan proposes a Hawkesbury River walk and public boat ramp, which is intended to be transferred to Council for care, control and management to ensure ongoing public access. The revised s94 plan contains funding provisions for park infrastructure.
- Sporting Fields & Pitt Town Bypass the revised s94 plan, prepared to accompany the JPG concept plan, will provide for 4 sporting fields for the Pitt Town community and include funding for half of the costing for the Pitt Town Bypass. The remainder will be funded through Regional Infrastructure Contributions from development of land not yet subject to a voluntary planning agreement.

- Biodiversity there will be no impacts on threatened species or communities. Vegetation adjoining Bona Vista Precinct will be retained, while a riparian corridor will be provided adjoining the Hawkesbury River. Water quality facilities will ensure no impacts on downstream users.
- Traffic and Transport the Pitt Town Road improvement works will cater for the increased traffic resulting from the development, in combination with the Pitt Town Bypass road.
- Heritage the increased density will have negligible impacts on the area already zoned for residential development under LEP Amendment No 145. Extensive investigations into the European and Aboriginal heritage of the deferred area has shown that the proposed development can be managed and will have acceptable impacts.
- Utilities and Infrastructure the proposed development can be serviced and construction is already under way to augment trunk water, sewerage, electricity and gas mains. Drainage and stormwater measures are proposed to minimise impacts on water quality.
- Ecologically Sustainable Development the EA demonstrates how the development will commit to ESD principles.
- Bushfire adequate asset protection zones will be provided around the retained vegetation adjoining Bona Vista Precinct. No other parts of the site are bushfire prone.
- Flooding the SES has advised that up to 1,100 additional lots can be developed at Pitt Town without major flood evacuation route upgrades. The 893 net additional lots proposed by the JPG concept plan and LEP 145 are achievable within the SES limit. Impacts of climate change have also been considered and appropriate mitigation measures proposed.

The increased density within the footprint of LEP Amendment No. 145 is considered to have negligible impacts, while development within the area deferred in the north-west of the site is considered to be acceptable with sufficient provision being made for the heritage values of Blighton as well as for Aboriginal archaeological and heritage values.

The development proposal is generally considered to have acceptable impacts and will result in a number of positive benefits including transfer of open space beside the Hawkesbury River, construction of a community centre near the Pitt Town Public School and recognition and preservation of historical fence lines.

7 CONCLUSION

- 7.1 The Department has reviewed the environmental assessment and the preferred project report and duly considered advice from public authorities as well as issues raised in general submissions in accordance with Section 75I(2) of the Act. All the relevant environmental issues associated with the proposal have been extensively assessed.
- 7.2 In balancing the State significant planning outcomes with the issues raised in the body of this report, the Department is of the view that the proponent has satisfactorily mitigated the environmental impacts arising from the subdivision of the Pitt Town site. In assessing the proposal, the Department has resolved any outstanding environmental issues through recommended modifications.
- 7.3 The proponent has committed (through Statements of Commitment) to a number of measures to ensure the development proceeds smoothly and does not adversely impact on local amenity and landscapes adjacent on the site. The Department is recommending further modifications to the concept plan to augment commitments made by the proponent.
- 7.4 Recommended modifications to the Concept Plan are provided at **Appendix A**. The reasons for the imposition of modifications are to encourage good urban design, maintain the amenity of the local area and adequately mitigate the environmental impact of the development.
8 **RECOMMENDATION**

It is recommended that the Minister for Planning:

- a) **consider** the findings and recommendations of this report.
- b) **grant** approval for the concept plan pursuant to s.75O(1) by signing the Instrument of Approval at **Appendix A**.
- c) **Determine**, pursuant to s.75P(1)(b), that approval to carry out the remainder of the project is subject to Part 4 of the EP&A Act.

(Note: The effect of (d) would be that:

- Future development is no longer a Part 3A project
- Pursuant to s.75P(2)(a), the determination of any DA in respect of such development must be generally consistent with the concept plan.)
- d) Authorise the Department to carry out post-determination notification.
- e) **Note** that the proposed listing of the site within the Major Projects SEPP will be pursued separately, however this does not preclude the Minister from approving the concept plan prior to the SEPP amendment.

Prepared by:

David Gibson Senior Planner

Endorsed by:

Simon Bennet Team Leader, Strategic Assessments Jason Perica Executive Director, Strategic Sites and Urban Renewal

ANNEXURE 3: Part 3A Approval and Concept Plan

ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

DETERMINATION OF THE PITT TOWN CONCEPT PLAN (MPA No. 07_0140)

(File No. S07/01449)

I, the Minister for Planning, under the *Environmental Planning and Assessment Act* 1979 ("the EP&A Act") determine:

- (a) To approve, under section 75O(1) of the EP&A Act, the concept plan for the project as described in Schedule 1, subject to the modifications set out in Schedule 2.
- (b) That approval to carry out the remainder of the project is to be subject to Part 4 of the EP&A Act, under section 75P(1)(b) of the EP&A Act, with the Council as the consent authority.

The reasons for modifications to the concept plan are:

- (1) To adequately mitigate the environmental impact of the development.
- (2) To maintain the amenity of the local area.

Frank Sartor MP Minister for Planning

2008 Sydney,

SCHEDULE 1

PART A — TABLE

Application made by:	Johnson Property Group
Application made to:	Minister for Planning
On land comprising:	Lot 101 DP 1113833; Lot 132 DP 1025876; Lot 14 DP 865977; Lot 11 DP 1021340; Lot 12 DP 1021340; Lot 13 DP 1021340; Lot 14 DP 1021340; Lot 15 DP 1021340; Lot 16 DP 1021340; Lot 17 DP 1021340; Lot 18 DP 1021340; Lot 2 DP 76375; Lot 1 DP 1057585; Lot 2 DP 1057585; Lot 3 DP 1057585; Lot 4 DP 1057585; Lot 2 DP 555257; Lot 1 DP 808945; Lot 2 DP 808945; Lot 3 DP 808945; Lot 1 DP 551960
Local Government Area	Hawkesbury City
For the carrying out of:	A detailed description of the proposal approved to is described in Modification A1, Part A, Schedule 2
Capital Investment Value	\$209,504,000
Type of development:	Concept approval under Part 3A of the EP&A Act
Determination made on:	10 July 2008
Determination:	Concept approval is granted subject to the modifications in the attached Schedule 2.
Date of commencement of approval:	This approval commences on the date of the Minister's approval.
Date approval is liable to lapse	5 years from the date of determination unless specified action has been taken in accordance with Section 75Y of the EP&A Act.

PART B - DEFINITIONS

In this approval the following definitions apply:

Act means the Environmental Planning and Assessment Act, 1979 (as amended).

Council means Hawkesbury City Council.

Department means the Department of Planning or its successors.

Director General means the Director General of the Department of Planning.

Minister means the Minister for Planning.

Project means development that is declared under Section 75B of the Act to be a project to which Part 3A of the Act applies.

Proponent means the person proposing the carry out of development comprising all or any part of the project, and includes persons certified by the Minister to be the proponent.

Regulations means the Environmental Planning and Assessment Regulations, 2000 (as amended).

RTA means the Roads and Traffic Authority.

Subject Site has the same meaning as the land identified in Part A of this schedule.

Pitt Town has the same meaning as the land identified in Part A of this schedule.

Pitt Town Concept Plan means the project described in Schedule 2, Part A, Modification A1 and the accompanying plans and documentation described in Schedule 2, Part A, Modification A2.

SCHEDULE 2

MODIFICATIONS TO THE PITT TOWN CONCEPT PLAN MPA No. 07_0140

PART A – ADMINISTRATIVE MODIFICATIONS

A1. Development Description

Concept approval is granted only to the carrying out of the development solely within the concept plan area as described in the document titled *"Environmental Assessment, Pitt Town Residential Precinct"* prepared by Don Fox Planning (dated December 2007) including:

- 1. Subdivision to create a total of 659 allotments within five precincts.
- 2. Provision of a 4.1 metre wide boat ramp with 16 car parking spaces and 14 car/trailer parking spaces adjacent to the Hawkesbury River.
- 3. Provision of related infrastructure comprising water supply mains, sewerage mains, road works, stormwater mains and water quality control and detention works.

Except for otherwise provided by the Department's modifications of approval as set out in Schedule 2, Part B.

A2. Development in Accordance with Documentation and Plans

The development shall be generally consistent with the following documentation and plans:

- a) Pitt Town Residential Precinct Environmental Assessment (Folder 1 & 2), prepared by Don Fox Planning and dated December 2007; except as amended by the Preferred Project Report titled Pitt Town Residential Precinct Concept Plan Preferred Project Report, prepared by Johnson Property Group and dated 28 March 2008, incorporating a Statement of Commitments prepared by Johnson Property Group.
- b) Pitt Town Masterplan, dated 25 March 2008 and prepared Brown Consulting.
- c) Masterplan for Bonavista, Drawing No. L03017-BONA-V5, dated 5 November 2007 and prepared by Brown Consulting; Masterplan for Fernadell, Drawing No. L03017-FERN-V5, dated 5 November 2007 and prepared by Brown Consulting; Masterplan for Blighton, Drawing No. L03017-Bligh-V6, dated 27 March 2008 and prepared by Brown Consulting; Masterplan for Cleary, Drawing No. L03017-CLEARY-V6, dated 27 March 2008 and prepared by Brown Consulting; Masterplan for Thornton, Drawing No. L03017-THORN-V6, dated 27 March 2008 and prepared by Brown Consulting; and Boat Launching Ramp & Trailer Park, Drawing No. JPG-L-BL 01 A, dated 6 November 2007 and prepared by Design & Construction Services.

Except for otherwise provided by the Department's modifications of approval as set out in Schedule 2, Part B and the proponent's revised Statement of Commitments received by the Department on the 18 April 2008.

A3. Inconsistency Between Documentation

In the event of any inconsistency between the modifications of this concept approval and the plans and documentation described in Modification A2, Part A, Schedule 2 referred to above, the modifications of this concept approval prevail.

A4. Lapsing of Approval

Approval of the Pitt Town Concept Plan shall lapse 5 years after the determination date in Part A of Schedule 1 unless an application is submitted to carry out a project or development for which concept approval has been given.

A5. Determination of Future Applications

The determination of future applications for development is to be generally consistent with the terms of approval of MPA No. 07_0140 as described in Part A of Schedule 1 and subject to the modifications of approval set out in Parts A and B of Schedule 2.

PART B - DEPARTMENT OF PLANNING'S MODIFICATIONS

B1. Design Guidelines and Development Controls

- (a) Concept plan approval is not provided for the proposed design guidelines and development controls submitted as part of this application (Appendix V in the Environmental Assessment dated December 2007 and Attachment G in the Preferred Project Report dated 28 March 2008).
- (b) Design guidelines and development controls are to be developed for future housing in Pitt Town, in collaboration with Hawkesbury City Council and the Department of Planning, to update the controls currently contained in Hawkesbury DCP Part E Chapter 4 Pitt Town, to reflect the lot sizes approved as part of this concept plan. The design guidelines are to address issues such as site coverage, front/side/rear setbacks, height, architectural character and external finishes, and flood risk.
- (c) In terms of flood risk, the design guidelines must consider the impact of climate change and formulate development options for future applications for houses in the Pitt Town subdivision, particularly within the precincts most effect by flooding and climate change i.e. Cleary and Thornton. In this regard, a combination of fill and raised habitable floor levels to 18.7m AHD is encouraged for houses proposed on blocks within the north of the Cleary and Thornton Precincts.
- (d) The amending design guidelines and development controls are to be submitted for approval by Council prior to the lodgement of the first application to Council for housing on blocks created by this concept plan approval. If Council fails to approve the design guidelines/ development controls by 31 August 2008, they are to be submitted for approval to the Director-General of the Department of Planning.

B2. Heritage and Visual Impact

In order to maintaining the open vista of land that was formally part of Governor Bligh's Model Farm, the number of lots bordering on the western boundary of the Blighton Precinct, facing the historically significant area known as the Pitt Town Bottoms, is to be reduced from 6 lots to 3 lots. This is to be achieved through the amalgamation of proposed lots 1 to 6 into a total of 3 lots.

Amended *Pitt Town Masterplan* and *Blighton Masterplan* plans, reflecting the amendment required by this modification, are to be submitted for the approval of the Executive Director, Strategic Sites and Urban Renewal, Department of Planning, prior to the lodgement of a development application for subdivision works for the Blighton Precinct.

B3. Lot Layout and Distribution

The lot layouts shown for each precinct are considered to be indicative only, however the maximum number of lots within each precinct as approved in this concept plan are not to exceed:

- Fernadell 210 lots
- Bona Vista 246 lots
- Blighton 19 lots
- Cleary 112 lots
- Thornton 69 lots

B4. Stormwater Disposal in Fernadell

The detention basin proposed in the northern part of the Fernadell open space area (*Figure 13 – General Layout of Detention and Water Quality Facilities by Brown Consulting* in the Environment Assessment) is to be deleted. This area is to remain unencumbered for the future provision of three full sized sporting fields.

B5. Regional and Local Contributions

- (a) Regional contributions are to be paid in accordance with the Planning Agreement between the Minister for Planning and the Johnson Property group, dated 26 July 2006.
- (b) Local contributions are to be paid in accordance with the Pitt Town Section 94 Contributions Plan 2008, subject to any direction of the Minister, in accordance with such plan.

B6. Water Supply

Written evidence of arrangements being made with Sydney Water, or other approved supplier, for the provision of individual water supply and sewerage services to all lots within each stage, will be submitted to the Principal Certifying Authority prior to certification of the Subdivision Plan in respect of that stage.

B7. Land Adjacent to Hawkesbury River

Discussions are to occur between the proponent and Council regarding the future use of the area of flood prone land located adjacent to the Hawkesbury River in the north of the Cleary Precinct. The negotiations are to determine whether there are any mechanisms available for the provision of community facilities on this land and/or public access, and the roles and responsibilities of the proponent and/or Council over this land in terms of ongoing maintenance and management.

APPENDIX B. STATEMENT OF COMMITMENTS

The Commitments set out below are made by the proponent, Johnson Property Group, in respect of the proposed subdivision of the Pitt Town site.

IMPACT	NATURE OF POTENTIAL	MITIGATION MEASURES / ENVIRONMENTAL SAFEGUARDS
Flooding	Need to ensure that houses are built on flood free land	Building envelopes will be specified on the Design Guidelines to be submitted with future development applications and will be enforced through covenants to be included in s88B Instruments.
Water quality	Possibility of increased levels of nutrients and contaminants in stormwater runoff. Likelihood of increased flow rates of stormwater in some catchments. Possibility of groundwater contamination	Provide details of the proposed water quality control and detention measures with relevant applications for development approval, including a Construction Environmental Management Plan. This Management Plan is to include consideration of impacts on groundwater and details of the proposed bio-filtration basin within the ecological area on Bona Vista.
Geotechnical	Possibility of disturbing acid sulphate soils if excavations are deeper than 1.5 metres	If excavations below 1.5 metres are proposed within Blighton, Cleary or Thornton Precincts, prepare an Acid Sulphate Soils Management Plan prior to obtaining a Construction Certificate.
	Possibility of contamination associated with previous orcharding within Thornton Precinct	Within the Thornton property, undertake sampling and contamination testing to determine the contamination status around former orchard and filling areas prior to obtaining development approval for this land.
	Need to identify geotechnical requirements for residential development within Cattai Precinct	Within Cattai Precinct, include a geotechnical investigation covering sub-surface testing for contamination and salinity as part of an application for development of this land. If the investigation reveals saline soils, the Development Application is to include measures for minimising impacts on groundwater.
	Need to ensure appropriate construction materials within Blighton, Cleary, Thornton and Cattai Precincts	Within Blighton, Cleary, Thornton and Cattai Precincts, the Construction Certificate Application should specify that construction materials, such as concrete, steel, brick etc. used for the proposed development should be appropriate for a mildly aggressive site
Groundwater	Need to ensure adequate subsurface drainage	Incorporate appropriate subsurface drainage measures into Construction Certificate plans.
Air Quality	Need to minimise air quality impacts	Future applications for development approval should include provisions for walking and cycling paths and for bus routes to reduce car usage
Flora and fauna	Need to ensure the existing limited environmental values of	Future development applications should include a landscape plan showing retention of as many

IMPACT	NATURE OF POTENTIAL	MITIGATION MEASURES / ENVIRONMENTAL SAFEGUARDS
	the site are retained and enhanced.	existing canopy trees as practical within the residential area, tanking into account the risks of retaining large native species close to dwellings.
	Need to ensure that the riparian corridor along the River is retained and enhanced.	Within the Blighton, Cleary and Thornton Precincts, landscape works are to include details of provisions to preserve a 45 metre wide riparian corridor along the Hawkesbury River. The landscaping plans is to ensure retention and regeneration of native species within the riparian corridor.
		Mitigation measures identified in The Ecology Lab - Aquatic Habitat Survey dated 29 November 2007 associated with the construction and operation of the boat ramp will form part of a future development application to approve and construct the boat launch site.
Heritage	Need to ensure that the heritage values of the site are protected during construction and in the longer term	The proponent is to pursue the establishment of a Voluntary Conservation Agreement (VCA) or similar form of protection over the Conservation Zone (Public Ownership) and Open Space Conservation Zone (Private Tenure) within Blighton Precinct (refer to Figure 11 of the EA), including measures to protect the identified Aboriginal, Historical Archaeological and Historic Cultural Landscape values.
		The proponent is to nominate the land within the Voluntary Conservation Agreement (VCA) over the Conservation Zone (Public Ownership) and Open Space Conservation Zone (Private Tenure) to NSW Heritage Council for inclusion on the NSW State Heritage Register and for inclusion as a Heritage item on the Hawkesbury LEP.
		Prior to obtaining a Construction Certificate for development within any precinct containing known archaeological artefacts, the proponent is to undertake any required archaeological salvage works in accordance with Section 90 of the National Parks and Wildlife Act 1974 (Amended 2001) and/or the Heritage Act 1977 and generally in accordance with the relevant AHMS reports.
		An archaeological assessment and impact assessment should be undertaken as part of the documentation for the Cattai Precinct Development Application.
		Prior to Development Approval for Blighton Precinct, the proponent is to prepare and submit for approval a Heritage Interpretation Plan that communicates the complementary and

IMPACT	NATURE OF POTENTIAL	MITIGATION MEASURES / ENVIRONMENTAL SAFEGUARDS
		overlapping Aboriginal and Historic heritage values of the land to the public and to those who will live in close proximity to the land.
Visual Impacts	Mitigating the visual impacts of development	 The applications for development of Bona Vista and Fernadell Precincts are to include: Retention of the existing Casuarina trees in the existing street reservation;
		 Location of large lots along Bathurst St with access denied to new lots fronting Bathurst Street;
		 Larger lots along the historical roads of Johnston Street
		 Retention of the curtilage around Bona Vista homestead and buildings;
		Retention of the park adjacent the Bona Vista homestead; and
		 Retention of the rectilinear street layout pattern
		 The applications for development of Blighton and Cleary Precincts are to include: Larger lots are located along the historical roads of Hall Street and Punt Road,
		 The houses edging the elevated land cannot build dwellings with finished floor levels below RL 17.3m AHD; and
		• The houses edging to elevated land are to have landscape and fencing style controls (open style rural fencing) for their lots extending northwards down the slope.
		Future development applications should provide for larger lots along the Cattai Road frontage.
Safer by Design	Need to ensure public surveillance	Future applications for development approval should include provision of pathways and cycleways in accordance with the Safer by Design Guidelines
Public transport	Need to show bus routes	The plans accompanying the relevant Development Application are to show the internal bus route complying with the HCC DCP.
Impact on watercourses	Need to gain approval from DWE for development within riparian zones	The proponent will negotiate with the Dept of Water and Energy (DWE) in relation to the preparation of plans for development of land adjacent to the watercourse in Thornton Precinct.
Blighton Riverside Park & Boat ramp	For public access	Prior to development approval of the Blighton, Cleary and Thornton precincts, JPG will use its best endeavours to negotiate with Council in

IMPACT	NATURE OF POTENTIAL	MITIGATION MEASURES / ENVIRONMENTAL SAFEGUARDS
		good faith for the transfer to Council of the Blighton Riverside Park Land in a manner which secures public ownership of the Blighton Riverside Park Land and its care and maintenance.
		If such an agreement between JPG and Council cannot be reached, then the Developer will retain the land in private ownership, but on the basis that it is fully accessible to the public and adequately cared for and maintained.
Proposed onsite Sporting Facility	AHD levelof Amenities building	During detail design of the proposed onsite sporting fields, investigate design AHD levels for the amenities building to see if it is possible for it to be raised above the 1 in 100 year flood level.

Other commitments made in this EA include:

- Lodge contour and design plans with each Development Application;
- Lodge plans showing lot numbers, dimensions and areas, together with details of easements and covenants with each Development Application;
- JPG will provide controls for the Minister to declare as Complying Development Controls by way
 of order under Section 75P(2)(d) of the Environmental Planning & Assessment Act 1979 for all
 housing in the Pitt Town Residential Precinct;
- Consideration of Total Water Catchment Management schemes, particularly for use of stormwater caught in water quality and detention ponds for irrigating playing fields;
- The 88B Instruments for allotments within Blighton, Cleary and Thornton Precincts will include restrictions on the types of development permitted in the rear of lots on or below the escarpment to reduce visual impacts; and
- Landscape plans, including themes for each Precinct, proposals for each road type, species lists and pathway and cycleway layouts will be submitted with each Development Application.



ANNEXURE 4: Rezoning Gazettal

2008 No 302



State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008

under the

Environmental Planning and Assessment Act 1979

Her Excellency the Governor, with the advice of the Executive Council, has made the following State environmental planning policy under the *Environmental Planning and Assessment Act 1979* in accordance with the recommendation made by the Minister for Planning. (S08/00552-1/PC)

FRANK SARTOR, M.P., Minister for Planning

Published in Gazette No 88 of 18 July 2008, page 7227

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Clause 1

2008 No 302 State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008

under the

Environmental Planning and Assessment Act 1979

1 Name of Policy

This Policy is State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008.

Aims of Policy 2

The aim of this Policy is to amend the Hawkesbury Local Environmental Plan 1989:

- (a) to establish appropriate zoning and other development controls on land to which this Policy applies, and
- to provide for appropriate development on land to which this (b) Policy applies that satisfies the principles of ecologically sustainable development and to promote the social and economic welfare of the community, and
- (c) to encourage the revitalisation of land to which this Policy applies.

3 Land to which Policy applies

This Policy applies to land in Pitt Town shown on the map marked "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Application Map" deposited in the office of the Council of the City of Hawkesbury.

Amendment of Hawkesbury Local Environmental Plan 1989 4

Hawkesbury Local Environmental Plan 1989 is amended as set out in Schedule 1.

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008

2008 No 302

Amendment of Hawkesbury Local Environmental Plan 1989

Schedule 1

(Clause 4)

Schedule 1 Amendment of Hawkesbury Local Environmental Plan 1989

[1] Clause 5 Definitions

Insert at the end of the definition of the map in clause 5 (1):

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Density Control Map

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Heritage Map

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Application Map

State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Zoning Map State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Lot Size Map

[2] Clause 10 Subdivision—general

Omit clause 10 (5). Insert instead:

(5) All subdivision is prohibited on the Pitt Town Site unless the area of each lot created for a dwelling house is equal to or greater than the minimum lot sizes for the land shown on the Lot Size Map and the number of lots created does not exceed the density control for the land shown on the Density Control Map.

[3] Clause 10 (7)

Insert after clause 10 (6):

(7) In this clause:

Density Control Map means the map marked "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Density Control Map".

Lot Size Map means the map marked "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Lot Size Map".

Pitt Town Site means the land shown on the map marked "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Application Map".

2008 No 302 State Environmental Planning Policy (Major Projects) Amendment (F Town) 2008	
Schedule 1	Amendment of Hawkesbury Local Environmental Plan 1989

[4] Clause 13 Subdivision by adjustment or relocation of boundaries

Omit "Hawkesbury Local Environmental Plan 1989 (Amendment No 145)" from clause 13 (1) (f).

Insert instead "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Application Map".

[5] Clause 54 Pitt Town—heritage

Omit "Hawkesbury Local Environmental Plan 1989 (Amendment No 145)"¹ from clause 54 (1).

Insert instead "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Heritage Map".

[6] Clause 55 Pitt Town—subdivision and regional transport infrastructure

Omit "Hawkesbury Local Environmental Plan 1989 (Amendment No 145)" from clause 55 (1).

Insert instead "State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008 Pitt Town Site Land Zoning Map".

[7] Clause 55 (3) (a)

Omit "the commencement of Hawkesbury Local Environmental Plan 1989 (Amendment No 145)".

Insert instead "18 August 2006".

[8] Clause 55 (3) (b)

Omit "the commencement of that plan". Insert instead "18 August 2006".

[9] Clause 56

Insert after clause 55:

56 Savings in relation to development applications made before the commencement of State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008

If a development application is made before the commencement of *State Environmental Planning Policy (Major Projects) Amendment (Pitt Town) 2008* and is not finally determined before that commencement, the application is to be determined as if that policy had not been made.

BY AUTHORITY

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ANNEXURE 5: Hawkesbury Council Report 25 August 2009

MINUTES: 25 August 2009

Item: 170 IS - Pitt Town Sewerage Strategy - Proposal from Johnson Property Group - (95494, 87959)

 Previous Item:
 11, Ordinary (3 February 2009)

 243, Ordinary (25 November 2008)

 146, Ordinary (8 July 2008)

Mr Neville Diamond, proponent, addressed Council. Mr Bill Sneddon, respondent, addressed Council.

MOTION:

RESOLVED on the motion of Councillor Reardon, seconded by Councillor Mackay.

Refer to RESOLUTION

280 RESOLUTION:

RESOLVED on the motion of Councillor Reardon, seconded by Councillor Mackay

That:

- Should a private water authority be granted a license to provide sewerage services to the new development area of Pitt Town, the current servicing strategy for Pitt Town be reviewed on the basis that the existing sewered area of Pitt Town continue to be serviced as part of the existing Council owned sewerage system.
- 2. In the event that the Pitt Town servicing strategy is altered, a review of the developer contribution plan for sewerage infrastructure for Pitt Town be undertaken and reported to Council.
- 3. Appropriate legal advice be obtained in respect of this matter as suggested within the report.

Meeting Date: 25 August 2009

Item: 170 IS - Pitt Town Sewerage Strategy - Proposal from Johnson Property Group - (95494, 87959)

Previous Item:	11, Ordinary (3 February 2009) 243, Ordinary (25 November 2008)
	146, Ordinary (8 July 2008)

REPORT:

Sewage disposal services for the existing village of Pitt Town is provided through a combination of a reticulated sewerage system for the majority of the village and on site disposal for the remaining lots.

The reticulated sewerage system is owned and operated by Council and consists of gravity mains carrying effluent from individual lots within the current village to a pumping station (P.S. J) located in Wellesley Street Pitt Town. The effluent is then pumped from P.S.J to the McGraths Hill Wastewater Treatment Plant (MHWWTP) via a rising main located generally along Pitt Town Road, for treatment. The pumping station and rising main is almost at capacity, and could accommodate only another 27 lots. The McGraths Hill Wastewater Treatment Plant is in a similar situation, having capacity for an additional 80 lots.

As Council is aware, the State Government approved a rezoning for land at Pitt Town on 10 July 2008, under part 3A of the Environmental Planning and Assessment Act 1979 creating potential for 943 lots within the rezoned area.

To provide reticulated sewerage services to the rezoned area, Council adopted a sewerage strategy in October 2008. The strategy had been developed by the Johnson Property Group (JPG), the major developer within the rezoned area.

The strategy required the construction of a new pumping station at Pitt Town (off Bootles Lane (P.S.T)) and a new rising main to transfer flows to McGraths Hill Wastewater Treatment Plant (MHWWTP). This new infrastructure has now been provided and has capacity to service both the existing village and the rezoned area.

As indicated previously, the MHWWTP has capacity for an additional 80 lots, however capacity is available at the South Windsor Wastewater Treatment Plant (SWWWTP) and as part of the adopted strategy a further pumping station was to be constructed in Windsor which would divert flows from the Windsor area via a rising main to the SWWWTP, which would then provide the additional capacity required at the MHWWTP to cater for the Pitt Town Development.

The cost to provide the infrastructure at Pitt Town and the new rising main to McGraths Hill is estimated at \$10,234,000. The cost to undertake the flow diversion from Windsor to the SWWWTP to give the additional capacity at McGraths is estimated to cost \$11,115,000. This part of the strategy has not yet commenced.

The total cost of this infrastructure is estimated at \$21,349,000, and in accordance with the adopted developer contribution scheme for the provision of sewerage infrastructure to the Pitt Town development, under Section 64 of the Local Government Act, the costs will be spread over the 943 lots at Pitt Town on the basis of \$22,640 per lot.

The Johnson Property Group (JPG) has indicated that it considers that the cost of sewerage infrastructure under this proposal is inequitable and prohibitive for the development of the Pitt Town Release Area and have submitted a revised servicing strategy for Pitt Town. The revised strategy consists of a proposal to construct a "Water Factory" for Pitt Town which treats sewage locally and produces high quality recycled water for non-potable uses within the community. JPG maintain that this proposal will reduce the infrastructure cost and improve the viability of the new development.

Meeting Date: 25 August 2009

A copy of the document outlining this strategy and titled" Hawkesbury City Council Pitt Town Water Utility" as submitted by JPG is included as an attachment to this report.

This option has become available to JPG through recent legislation, the "Water Industry Competition Act 2006" (WICA) enacted in August 2008.

In brief this legislation enables private entities to become a Water Authority with all the powers of any current Water/Sewer Authority. The legislation falls under the responsibility of the Minister for Water and is regulated through the Independent Pricing and Regulatory Tribunal (IPART).

Councils play no part in the determination of granting a licence. The process is governed by IPART and the Minister for Water. IPART has strict guidelines as to who can be granted a licence, however once a licence is granted under WICA, residents connected to a private sewerage supply will fall outside Hawkesbury City Council's authority for sewer services.

This does not mean that residents or proposed development sites within the designated operational area of a private Water Authority are required to connect to the private Water Authority's sewerage system. Residents or developers may choose to connect to any sewer available to their properties that is provided by any sewer authority.

A WICA fact sheet is included in the submission by JPG referred to above.

The JPG has submitted three options in relation to the alternative strategy for the Pitt Town development:

Option 1 – Council Owned infrastructure

- Council **retains ownership** of existing sewerage assets.
- The Private Pitt Town Water Utility builds and transfers ownership of the new Water Factory, all new sewerage and recycled water reticulation to Council.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system for 25 years minimum in order to generate a suitable commercial return on investment to the Private Pitt Town Water Utility.

This option would see Council as the responsible entity and as such would be required to obtain a 3rd wastewater treatment plant license. The cost to Council is based on a "cost plus" basis for both the maintenance and renewal program and fee for service for the operation of the sewerage system. This option also has issues under the Local Government Tendering Regulations.

Option 2 – Separate Ownership of assets - transferred to Council after 99years

- Council **retains ownership** of existing sewerage assets and leases these assets to a Private Pitt Town Water Utility.
- The Private Water Pitt Town Utility builds and **owns** the new Water Factory, all new sewerage and recycled water reticulation and transfers ownership to Council after 99 years.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system for a 99 year term. Thereafter, the parties may choose to revert to Option 1 or Council may become the operator.

This option provides the following lease conditions (for infrastructure owned by Council) to the Private Pitt Town Water Utility to operate the entire system under a Private Pitt Town Water Utility – WICA water license.

- 99 year term
- Peppercorn asset rental
- Equivalent level of service for existing residents
- Adopt Council's current maintenance and renewal programme

Meeting Date: 25 August 2009

- Volumetric payment to Council for sewage discharged to McGraths Hill
- Sewerage service charge to residents equal to the average Hawkesbury City Council sewerage charge
- Recycled Water service and usage charges to residents equal to Sydney Water charges for Rouse Hill.

Option 3 – Private Pitt Town Water Utility Owned

- Council transfers ownership of the existing sewerage assets to the Private Pitt Town Water Utility.
- The Private Pitt Town Water Utility builds and owns the new Water Factory and all new sewerage and recycled water reticulation.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system under its water license for perpetuity. The PPTWU may sell, lease or transfer the system or the operations (or both) to anyone in the private or public water utility market.

The conditions outlined under this option include:

- Equivalent level of service for existing residents
- Determine own maintenance and renewal programme to meet bullet point 1
- Volumetric charge for all sewage discharged to McGraths Hill to Council
- Sewerage service charge to residents equal to the average Hawkesbury City Council sewerage charge
- Recycled Water service and usage charges equal to Sydney Water charges for Rouse Hill.

As stated previously, a private Water Authority can obtain a license under which that Authority can provide sewerage services to an area. The issue to be decided is whether Council wishes to consider the options outlined within the JPG proposal or any other option in relation to the provision of sewerage services to the existing Pitt Town area and the Pitt Town Development Area.

It is considered that the risks involved in the options outlined within the JPG alternative strategy including tendering provisions, the rate of development, over which Council has no control, possible invoking of Public Private Partnership legislation and unknown ongoing operating costs, are such that a conservative approach should be taken based on the knowledge that a license under WICA will most likely be granted for the new development area of Pitt Town.

It is suggested that the status quo should remain in relation to the area of Pitt Town currently being serviced by Council. The new development area would be serviced by the private water authority.

This action, as with any of the other options proposed would require the review of Council's adopted strategy for the provision of sewerage services to the new Pitt Town development and the current development contribution plan for the provision of sewerage infrastructure for Pitt Town.

As a consequence of this approach, should a private water authority be established access to Council's sewerage infrastructure will still be required and this can be dealt with as the process and proposal develops. Alternatively the private water authority would need to obtain a license to discharge into a receiving waterway (ultimately the Hawkesbury River).

It is also considered that Council should obtain its own legal advice in respect of this proposal and the options that are being suggested from the aspects of both the effects of the WICA and the options proposed in this regard from the viewpoint of legislative requirements that may affect Council.

Conformance to Strategic Plan

The proposal is deemed to conform with the objectives set out in Council's Strategic Plan i.e.

"Strategic Direction: Implement infrastructure strategy to underpin the social, cultural and commercial development of the City."

Meeting Date: 25 August 2009

Funding

Nil impact on current budget.

RECOMMENDATION:

That:

- 1. Should a private water authority be granted a license to provide sewerage services to the new development area of Pitt Town, the current servicing strategy for Pitt Town be reviewed on the basis that the existing sewered area of Pitt Town continue to be serviced as part of the existing Council owned sewerage system.
- 2. In the event that the Pitt Town servicing strategy is altered, a review of the developer contribution plan for sewerage infrastructure for Pitt Town be undertaken and reported to Council.
- 3. Appropriate legal advice be obtained in respect of this matter as suggested within the report.

ATTACHMENTS:

AT - 1 Submission by Johnson Property Group, titled "Hawkesbury City Council – Pitt Town Water Utility" – (to be distributed under separate cover).

0000 END OF REPORT 0000

Pitt Town Water Utility Options for the construction, operation and maintenance of the Pitt Town sewerage and recycled water system July 2009



Hawkesbury City Council Pitt Town Water Utility

Options for the construction, operation and management of the Pitt Town sewerage and recycled water system

Terry Leckie

July 2009



Hawkesbury City Council & Johnson Property Group

Options for the construction, operation and management of the Pitt Town sewerage & recycled water system

1.0 Introduction

Johnson Property Group met with representatives of Hawkesbury City Council on 12th May 2009 to discuss a proposal to introduce water recycling to the Pitt Town Village. Recycled water would be generated and distributed via a privately owned and operated sewerage treatment facility known as a "Water Factory". (Refer *'Revised Pitt Town Water Servicing Strategy –26 May 2009'*)

A further meeting was held on the 27th May 2009. At that meeting, it was agreed that the proposal should be developed further through a working group comprising Council staff and representatives from the Johnson Property Group. The intention is to present a formal submission to Council at a meeting in August.

This paper presents information developed from workshops held at Council offices on 5 June and 2 July 2009. The following people were involved in the workshops:

Mr Chris Daley – Hawkesbury City Council Mr Ramez Younan - Hawkesbury City Council Mr Ross Blancato – Johnson Property Group Mr Terry Leckie – Blue Sky Consulting

> blueSKYCONSULTING po box 500 balgowlah nsw 2093 +61 2 9969 5574

2.0 Background

Pitt Town consists of a semi rural residential community and a township of 230 residential lots and one primary school.

Hawkesbury City Council recently approved a rezoning of land surrounding the Pitt Town Township that will lead to a further 1040 residential lots being developed over the next 15 to 25 years.

The Pitt Town Township is currently serviced by a drinking water supply from Sydney Water and a sewerage system installed and operated by Hawkesbury City Council.

The drinking water supply requires minimal augmentation to service the additional 1040 residential lots. The sewerage system is unable to accommodate the additional sewage flows and requires major new infrastructure.

Hawkesbury City Council adopted a sewerage strategy in October 2008. The strategy required the construction of a new pumping station at Pitt Town and a new rising main to transfer flows to McGraths Hill Wastewater Treatment Plant (WWTP). This new infrastructure has been installed.

The McGraths Hill WWTP is close to its capacity therefore a further pumping station and rising main is required to transfer the Pitt Town flows from McGraths Hill to South Windsor WWTP.

The total cost of this infrastructure is \$21,349,000, the costs will be spread over 943 new lots at Pitt Town at a Section 64 contribution of \$22,640 per lot.

The cost of sewage infrastructure under this proposal is considered to be inequitable to the incoming residents and prohibitive for the development of the Pitt Town Release Area.

Water Recycling and the installation of a Water Factory at Pitt Town will reduce the infrastructure cost and improve the viability of the new development by JPG.

Pitt Town Water Utility Options for the construction, operation and maintenance of the Pitt Town sewerage and recycled water system .July 2009

3.0 The System

The Pitt Town sewerage system comprises the following:

- 1. Existing Pitt Town Village 230 lots plus primary school
- 2. Existing unsewered Rural Pitt Town (Amelia Grove plus Hall Rd pump outs)
- 3. New Development JPG
- 4. New Development Others.

4.0 The Fundamental Assumption

It was agreed that a single entity should provide sewerage services for the whole of the Pitt Town village area.

5.0 Pitt Town Water Utility Options

5.1 Option 1 – Council Owned infrastructure

- > Council **retains ownership** of existing sewerage assets.
- The Private Pitt Town Water Utility builds and transfers ownership of the new Water Factory, all new sewage and recycled water reticulation to Council.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system for 25 years minimum in order to generate a suitable commercial return on investment to the Private Pitt Town Water Utility.

Infrastructure owned by Council -

- Existing gravity sewer system in Pitt Town village
- SPS and old rising main J to McGraths Hill
- New rising main J and new Fernadell Carrier
- New SPS and new rising main T to McGraths Hill
- New Blighton Carrier.(As currently constructed part only)
- New gravity sewers in the new development. (Stages 1 and 2)
- Water Factory



Pitt Town Water Utility Options for the construction, operation and maintenance of the Pitt Town sewerage and recycled water system .July 2009

- Recycled Water storages
- Sewage storage at SPS T
- Low Pressure Sewer Systems
- Recycled Water reticulation

Infrastructure owned by Private Pitt Town Water Utility

• Nil

Operational Conditions will be as follows:

- Council is the responsible entity and will need to obtain a 3rd wastewater treatment plant license.
- Standard Council operational contract
- Equivalent level of service for existing residents
- Adopt councils current maintenance and renewal programme on a "Cost Plus" basis
- Fee for service (operating the sewage system) would be on a "Cost Plus" basis.

Issues & questions addressed in Section 6.

5.2 Option 2 – Separate Ownership transferred to Council Owned

- Council retains ownership of existing sewerage assets and leases these assets to a Private Pitt Town Water Utility.
- The Private Water Pitt Town Utility builds and owns the new Water Factory, all new sewage and recycled water reticulation and transfers ownership to Council after 99 years.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system for a 99 year term. Thereafter, the parties may choose to revert to Option 1 or Council may become the operator.

Infrastructure owned by Council -

- Existing gravity sewer system in Pitt Town village
- SPS and old rising main J to McGraths Hill
- New rising main J and new Fernadell Carrier



- New SPS and new rising main T to McGraths Hill
- New Blighton Carrier.(As currently constructed part only)
- New gravity sewers in the new development. (Stages 1 and 2)

Infrastructure owned by Private Pitt Town Water Utility for the 99 year term.

- Water Factory
- Recycled Water storages
- Sewage storage at SPS T
- Low Pressure Sewer Systems
- Recycled Water reticulation

Lease conditions (for infrastructure owned by Council) to Private Pitt Town Water Utility to operate entire system under Private Pitt Town Water Utility – WICA water license.

- 99 year term
- Peppercorn asset rental
- Equivalent level of service for existing residents
- Adopt councils current maintenance and renewal programme
- Volumetric payment to Council for sewage discharge to McGraths Hill
- Sewage service charge to residents equal to average Hawkesbury City Council sewage charge
- Recycled Water service and usage charges to residents equal to Sydney Water charges for Rouse Hill.

Issues & questions addressed in Section 6.

5.3 Option 3 – Private Pitt Town Water Utility Owned

- Council transfers ownership of existing sewerage assets to the Private Pitt Town Water Utility.
- The Private Pitt Town Water Utility builds and owns the new Water Factory, <u>all new</u> sewage and recycled water reticulation.
- The Private Pitt Town Water Utility operates and maintains the whole of the Pitt Town sewerage and recycled water system under its water license for



perpetuity. The PPTWU may sell, lease or transfer the system or the operations (or both) to anyone in the private or public water utility market.

Infrastructure owned by the Private Pitt Town Water Utility -

- Existing gravity sewer system in Pitt Town village
- SPS and old rising main J to McGraths Hill
- New rising main J and new Fernadell Carrier
- New SPS and new rising main T to McGraths Hill
- New Blighton Carrier.(As currently constructed part only)
- New gravity sewers in the new development. (Stages 1 and 2)
- Water Factory
- Recycled Water storages
- Sewage storage at SPS T
- Low Pressure Sewer Systems
- Recycled Water reticulation

Infrastructure owned by Council:

• Nil

Private Pitt Town Water Utility Operational conditions

- Equivalent level of service for existing residents
- Determine own maintenance and renewal programme to meet bullet point 1
- Volumetric charge for all sewage discharged to McGraths Hill to Council
- Sewage service charge to residents equal to average Hawkesbury City Council sewage charge
- Recycled Water service and usage charges equal to Sydney Water charges for Rouse Hill.



Pitt Town Water Utility Options for the construction, operation and maintenance of the Pitt Town sewerage and recycled water system .July 2009

Issues & questions addressed in Section 6.

6.0 Questions.

The following questions may arise in any fair assessment of the concepts presented above. The concepts may have impacts on either the Council or the Private Pitt Town Water Utility and as such we have sought a legal perspective where appropriate and include that advice at Appendix 3.

Additional questions have been generated through the Council/JPG workshop meetings and as such have been included along with comments and/or preliminary answers.

6.1 - Is there a need to amend the current Pitt Town Wastewater Section 64 plan?

Yes. This is common to all options. A Council resolution would be required.

6.2 - Is there a need for a section 68 LGA approval?

Yes. This is common to all options.

6.3 - Is there a need to competitively tender the contract involving council owned infrastructure?

Section 55 of the Local Government Act provides that a council must invite tenders before entering into any of the following contracts:

"(c) a contract to perform a service or to provide facilities that, by or under any Act, is directed or authorised to be performed or provided by the council,

(d) a contract to perform a service or to provide facilities that, under some other contract, the council has undertaken to perform or provide for some other body,

(g) a contract for the disposal of property of the council,"
All options clearly involve the above types of services and facilities, and the use of Council property will be probably be caught by the reference to the 'disposal' of Council property.

The following classes of contracts are excluded from the requirements to tender:

• a contract where, because of extenuating circumstances, remoteness of locality or the unavailability of competitive or reliable tenderers, a council decides by resolution (which states the reasons for the decision) that a satisfactory result would not be achieved by inviting tenders

• a contract involving an estimated expenditure or receipt of an amount of less than \$100,000 or such other amount as may be prescribed by the regulations

Some options involve no expenditure by Council and as such this may permit Council to proceed without tender (expenditure of under \$100,000).

The financial viability of this alternative servicing strategy relies on the rate of development which is controlled by JPG (the proponent). It is that relationship between the development and servicing arms of JPG that permits the offer to be made. The servicing aspect of development shifts to the developer under this model.

The rate of development is a fundamental factor in the financial model. Council has no control over this factor. The rate of development is the fundamental market risk that any developer takes in the normal course of business on every project. It is <u>not</u> something that can be transferred to a third party without additional cost to offset that risk. Under these circumstances tendering does not create the usual competitive tension.

The demonstration of value arises from the developer's desire to maximize margins on land sales by reducing the cost of development. This servicing proposal must therefore be cost effective relative t the traditional forms of servicing .Otherwise it would not be proposed.

Council needs to ensure that as a consequence of adopting this approach, it does not accept a higher risk than it has at present. The risk in this proposal is partially carried by the developer and partially by the licensing authority (WICA) and the NSW State Government (IPART) in creating a competitive water market. Council's risk is diminished. In the event of failure, it would be incumbent on the NSW the State Government (through IPART) to seek out solutions. These solutions could include going out to the water market comprised of both public and private operators to step in.

6.4 - Does this arrangement fall under the definition of a Public Private Partnership as per section 400B of the LGA?

A public-private partnership is defined under section 400B of the Local Government Act to mean an arrangement:

- (a) between a council and a private person to provide public infrastructure or facilities (being infrastructure or facilities in respect of which the council has an interest, liability or responsibility under the arrangement), and
- (b) in which the public infrastructure or facilities are provided in part or in whole through private sector financing, ownership or control.

A council must not enter into a public-private partnership unless the council has provided the Director-General with an assessment of the project to be carried out under the partnership. In providing such an assessment, the general manager of the council is required to certify that it has been prepared in accordance with the PPP Guidelines.

However, the Local Government Act regulation 408 seems to say (and the PPP Guidelines back this up) that a contract which is subject to the tendering requirements is **not** something that requires a separate approval as a PPP. However, the PPP Guidelines go on to say:

"Notwithstanding these exclusions [ie for tendering], in general terms, arrangements will need to comply with [the PPP requirements] of the Act where the council retains an equity or an ongoing obligation in the provision of public infrastructure, facilities or services."

This could be the case as Council will still operate McGrath's Hill WWTP.

The PPP guidelines also state:

"If a council is unsure about whether or not a project is a PPP, advice should be sought from the Director General. The aim of the legislation is to ensure that complex and/or risky projects are understood and well managed so that project delivery occurs in line with expectations and so that risks are minimised through a rigorous process. *Councils should not seek to avoid the legislation by attempting to circumvent the PPP definition."*

6.5 - What happens if the Private Water Utility fails financially?

The company's financial capacity is scrutinised by the Independent Pricing and Regulatory Tribunal (IPART) as part of the Water Industry Competition Act (WICA) Licensing process.

It is IPART's responsibility to ensure that the company complies with all of its performance criteria throughout the license period (renewal required every 10 Years).

Financial failure will be dealt with by IPART and it is their responsibility to ensure that an appropriate level of service is continued for the residents of Pitt Town.

In a mature market, other operators would pursue the business opportunity presented by the commercial arrangement that exists with Council. This may occur on renegotiated or different terms. The mature market could include Council, Hunter or Sydney Water et al.

6.6 - What happens if the sewerage system fails due to a design fault?

The Private Water Utility will ensure that it has the appropriate professional indemnity insurances. These insurances are a condition of license and are checked by IPART.

The Private Water Utility will be required to maintain an acceptable level of service whilst rectifying any design fault.

6.7 - What happens if system failure occurs as a result of operator performance?

Technical experience and management systems are scrutinised by the Independent Pricing and Regulatory Tribunal (IPART) as part of the Water Industry Competition Act (WICA) Licensing process.

The Private Water Utility is required to join and promote the Water Ombudsman scheme that provides an independent party to assist with customer complaints that might arise.



The WICA includes penalties for breaches in license conditions. These conditions include operational performance.

6.8 - What are the charges for other developers who will be serviced by the Private Pitt Town Water Utility?

Charges for capital expenditure will be developed on a similar basis to those determined under a section 64 contribution plan for Pitt Town. That is the Estimated Costs (Excl GST) divided by 943 lots.

Service and usage charges will be the same for all Pitt Town households and will be in parity with the surrounding Hawkesbury and Rouse Hill areas.

6.9 - Operation of existing infrastructure under the revised servicing approach?

No changes will be required. Our expectation is that the existing infrastructure will remain as is and the extended low pressure sewer system and recycled water factory will connect into the system without major alteration.

6.10 - Headworks Charges for Pitt Town

Council officers suggested that Council may seek to impose an additional charge of \$6796.50/lot for headworks charges. This matter was raised as an item to be further discussed however council should consider three important facts.

- 1. The new sewage concepts proposed above will all service the entire New Pitt Town Release Area (Existing residents, JPG development lands and what will potentially become other developer's holdings). The level of access to existing infrastructure used to service the rest of the Hawkesbury LGA will remain at the same level as it does before development; that allowed for the existing village + 80 lots = 327 ET.
- Under the current sewage concept, which involves a \$10m new rising main and pump station from Pitt Town to McGraths Hill (already built by JPG) and \$12m to transfer flows from McGraths Hill to South Windsor, Pitt town was seen as a part of the wider Hawkesbury City Council sewage system.

Under the current concept, the need for the transfer of flows is eliminated, as is augmentation of the pumping systems beyond that which currently exists

and serves the existing village. The recently constructed works under the current sewage concept (\$10m/ \$22m) are actually an impediment.

3. In late 2008, the NSW State Government abolished headworks charges for new development in the Sydney Water and Hunter Water districts. The NSW government recognized that such charges were a disincentive to economic growth, led to intergenerational inequity and generally targeted homemakers at their most vulnerable and leading many of them to make interstate choices ahead of NSW. The same could be said for the Hawkesbury.

6.11 - Council Charges for sewage transfer to McGraths Hill STP

The working group is to determine the most appropriate charging methodology for sewage transfers from Pitt Town to McGraths Hill STP.

The working group needs to ensure there is a consistent approach to charging across the whole of the municipality.

Currently 2 methods have been put forward. Each method produces approximately the same charge per kL of sewage transferred.



	Costs	Return	Standards	Risk
Option 1	There are	-\$391,000 in	The	1.Development takes
	costs to	year 1	responsibility of	longer than planned.
	council before	То	Council.	2.Recycled Water
	breakeven at	\$179,000 in		Sales are lower than
	year 20	year 18		expected.
				3.Costs are higher
				than budgeted.
Option 2	\$0	\$0 - 135,500	The	1.Private Water Utility
		(McGraths Hill)	responsibility of	provides a lesser level
		\$50,000	the Private	of service than
		(SPS O&M costs	Water Utility for	Council.
		saving)	99 years or such	
		Total Value	longer term as	
		\$210,000 pa	Council decides.	
Option 3	\$0	\$0 - \$135,500	The	1.Private Water Utility
		(McGraths Hill)	responsibility of	provides a lesser level
		\$50,000	the Private	of service than
		(SPS O&M costs	Water Utility.	Council.
		saving)		
		Total Value		
		\$210,000 pa		

7.0 Risk - Table showing risk to Council

Option 1 places additional market risks on Council. These risks are development delays, recycled water use and operations cost fluctuations. The cashflow shows a **loss** of between \$391,000 and \$45,000 over the first 7 years and a breakeven return at 20 years. These losses exclude any impact of risk. Option 1 shows reasonable return after year 20 however this assumes that council has been able to mitigate the risks described in 1 above.

Option 2 places all risk with the Private Utility. Council obtains revenue for sewage transferred to McGraths Hill and is able to reduce its operation and maintenance expenditure for the existing infrastructure at Pitt Town. Operation and Maintenance of the existing system becomes the responsibility of the Private Utility under this option. The use of a 99 year lease provides Council with a contractual end date that permits future Council administrators servicing options. Control over the asset is retained.

Option 3 is the same as Option 2 except that council hands over all assets to the Private Water Utility.

8.0 Recommendation

Option 2, where Council **retains ownership** of existing sewerage assets and leases these assets to a Private Pitt Town Water Utility, is recommended. This option provides Council with the greatest return, the least risk and options for the future.

WICA licensing conditions together with councils lease conditions for the assets will ensure that Pitt Town residents continue to receive a high level of service.

Council will reduce its existing costs by \$50,000 a year (re: Ramiz Younan) and receive a rental income of up to \$135,500 a year for the use of the existing assets.

9.0 Appendices

Appendix 1 Water Industry Competition Act - Overview of licensing regime Factsheet



Pitt Town Water Utility Options for the construction, operation and maintenance of the Pitt Town sewerage and recycled water system July 2009

APPENDIX 1

Water Industry Competition Act - Overview of licensing regime Factsheet





WICA FACT SHEET

Overview of licensing regime under the *Water Industry Competition Act 2006*

August 2008

Introduction

The NSW Government introduced the *Water Industry Competition Act* 2006 (the Act) http://www.ipart.nsw.gov.au/water/privatesector-licensing/regulatory-framework.asp as part of its strategy for a sustainable water future to harness the innovation and investment potential of the private sector in the water and wastewater industries. At the same time, the Act establishes a licensing regime for private sector entrants to ensure the continued protection of public health, consumers and the environment.

A person must not construct, maintain or operate any water industry infrastructure or to supply water (potable or non-potable) or provide sewerage services by means of any water industry infrastructure otherwise than under the authority of a licence under the Act. An application for a licence may only be made by or on behalf of a corporation.

However, a public water utility does not require a licence in relation to water industry infrastructure situated within its area of operations. (Note: There are other exemptions to the requirement for a licence. See Fact Sheet "Who needs a licence under the WIC Act?" for more information at http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.)

Legislative framework

The Act sets out when a licence is required, the procedures for applying for a licence, how licences and licence fees are determined, and how licences are audited and enforced. The Act establishes mechanisms to resolve disputes between private sector bodies and their customers, and to protect customers in the event of the failure of a new market entrant (i.e. retailer of last resort provisions). The Act also establishes a register of licences to provide key licensing information to licensees and the public.

The Act sets out the functions and responsibilities given to the Minister for Water (the Minister) and the Independent Pricing and Regulatory Tribunal (IPART) in relation to the licensing regime. The Minister's functions include determining whether to grant a licence, determining licence conditions, setting licence fees and enforcing licences. IPART's functions include considering licence applications, recommending the terms or conditions of a licence to the Minister, and auditing and enforcing licences. The Minister also has a range of functions to ensure the integrity of the licensing regime, such as giving emergency directions to deal with a risk to public health or safety, declaring specified persons as retailers of last resort and declaring a supply failure.

The Act is supported by the *Water Industry Competition (General) Regulation 2008* (the Regulation)

http://www.ipart.nsw.gov.au/water/privatesector-licensing/regulatory-framework.asp which sets out the matters a licence application must address, standard licence conditions, information to be contained on the register of licences and the retailer of last resort provisions. The Regulation also provides for the establishment of a marketing code of conduct, a transfer code of conduct and a water industry code of conduct.

The following information provides an overview of the elements of the licensing regime set out under the Act and the Regulation.

Types of licences granted

Corporations that wish to supply water or provide sewerage services must obtain a licence.

There are two types of licences:

- a network operator's licence, and
- ▼ a retail supplier's licence.

Network operator's licence

A network operator's licence must be obtained to construct, maintain or operate water industry infrastructure. Once the Minister has granted a network operator's licence, the licensee is entitled to operate on terms similar to a public water utility. Specifically, licensed network operators are entitled to:

- carry out work in or under public roads and public reserves to construct water industry infrastructure
- require landowners to stop trees, other structures and things on their land from damaging their infrastructure
- retain ownership of all the water industry infrastructure they construct, whether or not they own the land in, on or over which it is situated

 appoint meter readers to enter private premises to read meters that measure the supply of water from or discharge of sewage into a water or sewer main controlled by the licensed network operator.

A licensed network operator does not need to pay the local council or roads authority for any water industry infrastructure located in a public reserve or public road or for the space in a public reserve or public road that is occupied by the infrastructure.

Retail supplier's licence

A retail supplier's licence must be obtained to supply water (potable or non-potable) or provide sewerage services by means of water industry infrastructure. A retail supplier may require access to existing infrastructure to supply water or provide a sewerage service via the use of that infrastructure. (For further information, see http://www.ipart.nsw.gov.au/water/networkaccess/network-access.asp.)

Licensed retail suppliers will be required to belong to an approved external ombudsman scheme to deal with disputes and complaints involving small retail customers.

Licensed retail suppliers are also required to implement any relevant government policy with respect to social programs that apply to it. Social programs for the supply of water and the provision of sewerage services are programs to ensure that those services are available to people in need, including those suffering financial hardship and those living in remote areas, and includes a program for the granting of payment assistance, discounts or rebates.

Licensed retail suppliers must comply with the water industry code of conduct, marketing code of conduct and transfer code of conduct established pursuant to the Regulation.

Applying for a licence

Licence applications must be lodged with IPART. (Licence application forms can be obtained from http://www.ipart.nsw.gov.au/water/privatesector-licensing/application-forms.asp). IPART will furnish copies of the application to the Minister. IPART will also furnish copies and invite submissions from:

- the Minister administering the Public Health Act 1991,
- the Minister administering Chapter 2 of the Water Management Act 2000,
- the Minister administering the Environmental Planning and Assessment Act 1979, and
- the Minister administering the Protection of the Environment Operations Act 1997.

IPART must also invite submissions on the application from the public.

IPART will consider the licence application, along with any submissions, and provide a report to the Minister recommending whether or not the licence should be granted and on what terms or conditions.

Obtaining a licence

Licences are granted by the Minister. In deciding whether or not to grant a licence, and what conditions the licence should be subject to, the Minister will consider (but is not bound to accept) any advice or recommendation in IPART's report.

To obtain a licence, applicants must:

- be a corporation
- not be a disqualified corporation
- have, and continue to have, the capacity (including technical, financial and organisation capacity) to carry out the activities to be authorised by the licence
- have the capacity to carry out the activities to be authorised by the licence in a manner that does not present a risk to public health or a significant risk of harm to the environment

- have made, and continue to maintain, appropriate arrangements with respect to insurance
- comply with such other matters as the Minister considers relevant, having regard to the public interest.

In addition, applicants for a retail supplier's licence to supply water must, if the licence is granted, be in a position to obtain sufficient quantities of water from a source other than from a public water utility.

In determining whether or not to grant a licence, and what conditions the licence should be subject to, the Minister will have regard to a number of licensing principles under the Act:

- protection of public health, the environment, public safety and consumers
- encouragement of competition
- sustainability of water resources
- promotion of production and use of recycled water.

Licence conditions

If an application is successful, a licence will be granted indefinitely, dependent upon the payment of annual licence fees and compliance with the licence. The licence will be subject to conditions imposed by the Act, the Regulation and the Minister.

Standard licence conditions that apply to all licences are set out in the Schedules to the Regulation. These standard licence conditions include requiring a licensed network operator to prepare and implement an infrastructure operating plan and water quality or sewage management plan (as is relevant), and a licensed retail operator to prepare and implement a retail supply management plan.

The Minister may impose such additional licence conditions as he or she see fits, consistent with the Act and the Regulation. In particular, the Minister may impose conditions to:

- ensure the licensee has, and continues to have, the capacity (including technical, financial and organisational capacity) to carry out the activities authorised by the licence,
- give and maintain security (in such amount and form as the Minister may determine) for the fulfilment of the licensee's obligations under the licence, and
- maintain appropriate arrangements with respect to insurance.

IPART will make recommendations to the Minister as to what licence conditions it believes the licence should be subject to.

The conditions of a licence may be varied at any time either by the Minister or upon application by the licensee. The existing conditions may be amended or new conditions may be imposed.

Commercial operation of new infrastructure

The granting of a licence does not allow the licensee to bring new water or sewerage infrastructure into immediate commercial operation. It is a standard licence condition on all network operators' licences that written Ministerial approval must be obtained prior to commencing commercial operation.

See Fact Sheet "Commercial operation of new infrastructure under the WIC Act" for further information at

http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.

Performance monitoring and reporting

The licensee must keep records and furnish information to IPART, where IPART requests the licensee to do so. IPART is required to report to the Minister annually on the compliance of licensees with their licence conditions. This report is to be laid before both Houses of Parliament.

Licence audits

A number of components of the licensing regime are subject to audit.

Compliance and licence review audits:

IPART is required to monitor and report to the Minister on a licensee's compliance with the conditions of the licence. In particular, IPART is required to review each licence at intervals of not more than every 5 years (starting from the date the licence commences). IPART may require an audit of the licence as part of its compliance reporting or licence review process.

Commercial operation of new infrastructure audits:

An audit must be conducted by an approved auditor and provided to the Minister in order to obtain his or her approval to bring any new water or sewerage infrastructure into commercial operation.

Plans and infrastructure audits:

Periodic audits by an approved auditor will also be required by the Minister or IPART as to the condition of the licensee's infrastructure and the adequacy of the licensee's infrastructure operating, water quality, sewage management or retail supply management plans (as is relevant to the particular licence).

See Fact Sheet "Summary of audit framework under the WIC Act" for further information at http://www.ipart.nsw.gov.au/water/privatesector-licensing/fact-sheets.asp.

Approved auditors

An approved auditor will conduct audits on behalf of the Minister, IPART or a licensee. An approved auditor is a person nominated by IPART, chosen by the licensee from a panel of persons nominated by IPART or nominated by the licensee and approved by IPART. See Fact Sheet "Joining the audit panel for the purposes of the WIC Act" for further information at http://www.ipart.nsw.gov.au/water/private-sector-licensing/fact-sheets.asp.

Licence enforcement

When a licensee contravenes the Act or the Regulation or a condition of the licence, the Minister or IPART may take a range of enforcement action. Such action could include (amongst other things) imposing a monetary penalty not exceeding \$500,000 for the first day of the contravention, and \$20,000 for each subsequent day (not exceeding 25 days); requiring a licensee to notify customers or take action to rectify the contravention; cancelling or suspending a licence; or disqualifying a corporation or individual for the purposes of the Act. (However, some of these enforcement actions can only be taken by IPART if the Minister concurs.)

Register of licences

IPART must maintain a register of licences on its website which will contain all the key information pertaining to each licence granted under the Act. The register can be found at

http://www.ipart.nsw.gov.au/water/private-sector-licensing/registers.asp.

Monopoly suppliers

A licensed network operator or a licensed retail supplier may be declared by the Minister to be a monopoly supplier if they provide a service for which there are no other suppliers to provide competition in that market, and for which there is no contestable market by potential suppliers in the short term and, in the case of a water supply service for recycled water, that connection of land to that service is required by or under some other Act.

If declared a monopoly supplier, the licensee may be subject to a pricing determination or periodic review of their pricing policies by IPART.

Retailer of last resort scheme

Where a licensed retail supplier can no longer supply water or provide sewerage services to its customers, the Act protects the continued supply of these customers by providing that a licensed retail supplier or a public water utility may be declared by the Minister as a retailer of last resort. In the event that the Minister declares a supply failure in relation to a licensed retail supplier, the retailer of last resort must commence supplying water or providing sewerage services to the customers in the area in respect of which it is the retailer of last resort.

Further information

For any further information on the licensing scheme, please contact IPART's Utility Licensing team either by:

- **phone** (02) 9290 8400 (general number)
- email compliance@ipart.nsw.gov.au

Legal context for this Fact Sheet

IPART has prepared this Fact Sheet as a general summary of relevant parts of:

the Act

Water Industry Competition Act 2006.

the Regulation

Water Industry Competition (General) Regulation 2008.

This Fact Sheet should not be relied on as a substitute for legal advice, and is designed to be read in conjunction with the above source documents.

F13 APPENDIX F:

SECTION 90 NPWS ACT PERMIT

Ref: FILC Contact Mar

FIL07/10432 Margrit Koettig 9996 6866

10 100 2001

Mr Keith Johnson Johnson Property Group PO Box A1308 Sydney South NSW 1235

Dear Mr Johnson

RE: s90&s87 #2720 Bona Vista, Pitt Town.

Fiona Leslie (AHMS) has advised the DECC that excavations at Bona Vista have been completed to Stage 3. The conditions of the consent required that DECC be notified at the completion of Stage 3 to ascertain whether further salvage excavation was warranted. AHMS have advised the DECC (20/8/07) that approximately 30 sq.m of deposit have been excavated and 50 artefacts were recovered. They concluded that the amount of archaeological material recovered does not justify the continuing of excavations in this area. The DECC supports this conclusion and advises that the no further archaeological salvage is required at the Bona Vista development area.

Yours sincerely

24/8/07

Lou Ewins Manager Planning & Aboriginal Heritage Climate Change & Environment Protection Group Department of Environment & Climate Change

> The Department of Environment and Conservation is now known as the Department of Environment and Climate Change

Department of Environment and Conservation NSW

PO Box 668 Parramatta NSW 2124 Level 7 79 George Street Parramatta NSW 2150 Telephone (02) 9995 6802 Facsimile (02) 9995 6900 ABN 30 841 387 271 www.environment.nsw.gov.au Ma

Margrit Koettig 9996 6866

18.5. JUL 205

Contact

Mr Keith Johnson Johnson Property Group PO Box A1308 Sydney South NSW 1235

Dear Mr Johnson

RE: s90&s87 #2720 Bona Vista, Pitt Town.

Enclosed is s.90 consent 2720, granted to Johnson Property Group the purpose of undertaking works associated with residential development which will impact Aboriginal site Pitt Town 2 (45-5-2489) and undertake salvage excavations.

Please note the special conditions attached to this Consent. You should also note the date of expiry for this Consent and permit and reporting requirements. The Consent covers only those areas described in Schedules A and B.

Yours sincerely

Stewart Williams A/Manager Planning & Aboriginal Heritage Climate Change & Environment Protection Group Department of Environment & Climate Change

> The Department of Environment and Conservation is now known as the Department of Environment and Climate Change

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VABN13018411538

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PO Box 668 Parramatta NSW 2124 Level 7 79 George Street Parramatta NSW 2150



CONSENT AND PERMIT #2720

CONSENT AND PERMIT TO COLLECT

CONSENT TO CARRY OUT THE DESTRUCTION OF AN ABORIGINAL OBJECT/PLACE AND PERMIT TO COLLECT AND/OR EXCAVATE FOR THE PURPOSE OF SALVAGE

Background

An application has been made to the Director-General of the Department of Environment and Climate Change by:

Johnson Property Group 340 Kent Street, Sydney, NSW 2000.

of (address in full):

for a permit pursuant to section 87 of the National Parks and Wildlife Act 1974 ("the Act") to disturb and move Aboriginal objects for the purpose of salvage and also a consent pursuant to section 90 the Act to destroy, damage or deface Aboriginal objects in the course of development activities associated with the development of Bona Vista, Pitt Town NSW as defined in Figure 1 attached to this consent.

Permit and consent granted subject to conditions

NOW I, Stewart Williams, A/Manager Planning & Aboriginal Heritage Section, Metropolitan Branch of the Department of Environment and Climate Change, grant to Johnson Property Group ("the proponent"):

(a) pursuant to Section 87 of the Act, a PERMIT for the disturbance and excavation of land described in Schedule B for the purpose of discovering Aboriginal objects and the disturbance and movement of certain Aboriginal objects identified in Schedule A on the land described in Schedule B, for the purpose of salvage; AND

(b) pursuant to Section 90 of the Act, CONSENT to destroy, damage or deface the remaining Aboriginal objects identified in Schedule A on the land described in Schedule B, following the salvage described in paragraph (a) above;

but only in accordance with all of the conditions of this permit and consent.

TERMS AND CONDITIONS OF THIS PERMIT AND CONSENT

This Permit and Consent are issued subject to the conditions specified below.

19

DATED at Sydney this

day of July

2007

Stewart Williams A/Manager Planning & Aboriginal Heritage Climate Change & Environment Protection Group Department of Environment & Climate Change (by delegation)

2

SCHEDULE A: Aboriginal objects to which this permit and consent apply

All Aboriginal objects on the land described in Schedule B, including the following registered Aboriginal sites:

Site name	Site reference	Site description	Approximate eastings (AMG)	Approximate northings (AMG)
Pitt Town 2	45-5-2489	Aboriginal campsite	301800	6282250

SCHEDULE B: Land to which this permit and consent apply ("the land")

"Bona Vista", 18 Johnson St, Pitt Town, NSW.

Lots 14 DP865977 and Lot 132 DP102225876 bounded by Bootles Lane, Amelia Grove, Johnson St and an unformed road along the eastern boundary (area defined in Figure 1 attached to this consent).

SPECIAL CONDITIONS RELATING TO PERMIT

The proponent must appoint **Fiona Leslie**, **AHMS** ("the Archaeologist") to oversee, for and on behalf of the proponent, the activities authorised by the permit, including salvage, monitoring and investigative works, unless an alternative person is approved in writing by the DECC office.

If an alternative person needs to be appointed whilst the permit remains in force, the proponent must advise the DECC office in writing of the name and relevant qualifications or experience of the individual that the proponent proposes to appoint as a replacement.

If, in the opinion of the DECC office, that person is unsuitable the proponent must provide, within 5 days of receiving a written request from the DECC, the details of 2 alternative individuals available to undertake this role and provide details of their name and relevant qualifications or experience.

- Archaeological salvage must undertaken in accordance with the research design "Bona Vista, Pitt Town: Archaeological Research Design to support a s90 Application for Aboriginal Archaeological Excavation". AHMS June 2007.
- The applicant must notify the DECC when Stage 3 of the excavation program is near completion.
- 4. The DECC is to confirm the requirements for expansion of the excavation to the proposed larger open area based on the results of Stages 1 to 3.
- 5. Any Aboriginal objects recovered, being the property of the Crown, shall be deposited at The Australian Museum, in accordance with adopted procedures for the deposition of Aboriginal objects as prescribed by The Australian Museum, at or before a period of twelve months from the date of salvage of the objects. Information about deposition requirements can be obtained from the Aboriginal Archaeological Collections Manager, Division of Anthropology, The Australian Museum, on (02) 9320 6000.
- 6. At the same time that Aboriginal objects are deposited in the Australian Museum, a copy of any relevant reports, field notes, site plans, section drawings and relevant photographs, shall be deposited at The Australian Museum.
- 7. The proponent must furnish the DECC office with a report within 2 years of the completion of the salvage/monitoring work. The report must include:
 - a complete list of all Aboriginal objects recovered;
 - a detailed description of the methods of excavation/collection and analysis used;

1.

- a detailed plan of the site, including the location of collection areas, all trenches, auger holes and spoil heaps;
- summary of consultation undertaken with the Aboriginal Community and any role that members of the Aboriginal Community played in monitoring, salvage or other activities on the land.

Conform to best practice principles of professional assessment and reporting.

CONDITIONS APPLYING TO BOTH PERMIT AND CONSENT

Commencement

3.

1. This permit and consent commence on the date this document was signed.

Duration of permit and consent

2. This permit and consent remain in force for ten (10) years from the date this document was signed.

Protection of human remains

To avoid any doubt, this permit and consent do not authorise damage to any human remains in, on or under the land.

If any human remains are located in, on or under the land, the proponent must:

- (a) contact the local police;
- (b) not disturb or excavate these remains;
- (c) immediately cease all work at the particular location;
- (d) notify the DECC office as soon as practicable and provide any available details of the remains and their location; and
- (e) not recommence any work at the particular location until authorised in writing by the DECC.

Protection of the Conservation Area (exclude this condition if not applicable)

- 4. The Conservation Area must not be disturbed.
- 5. Vehicles must not be driven in the Conservation Area.
- 6. The Conservation Area must not be used to store plant, equipment or any materials, including fill.

GENERAL TERMS AND CONDITIONS APPLYING TO BOTH PERMIT AND CONSENT

- 1. This permit and consent are not transferable.
- 2. This permit and consent may be revoked at any time at the discretion of the Director-General.
- 3. The terms and conditions of this Permit and consent may be varied at any time at the discretion of the Director-General.
- 4. The proponent must ensure that all of its employees, contractors, sub-contractors and agents are made aware of the conditions of this permit and consent and the corresponding offence provisions and obligations contained in the Act.
- 5. The proponent must notify the DECC office in writing as soon as practicable after becoming aware of any failure to comply with Part 6 of the Act or any condition of this permit and consent.
- 6. Where a DECC officer reasonably suspects that an incident which may have breached Part 6 of the Act has occurred, the officer may request in writing that the proponent prepare a written report as soon as practicable about the incident.

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7. The proponent agrees to indemnify and keep indemnified, the Crown in right of NSW (DECC), the Minister administering the Act, the Director-General, and their employees, agents and contractors, in the absence of any willful misconduct or negligence on their part, from and against all actions, demands, claims, proceedings, losses, damages, costs (including legal costs) charges or expenses suffered or incurred by them resulting from any damage or destruction to any real or personal property and injury suffered or sustained (including death) by any persons arising out of or in connection with the activities undertaken pursuant to this permit and consent.

The proponent agrees to release to the full extent permitted by law, the Crown in right of NSW (DECC), the Minister administering the Act, the Director-General, and their employees, agents and contractors, in the absence of any willful misconduct or negligence on their part, from all suits, actions, demands and claims of every kind resulting from any damage or destruction to any real or personal property and injury suffered or sustained (including death) by any persons arising out of or in connection with the works undertaken pursuant to this permit.

DECC is entitled to make copies of any reports provided to DECC under this permit and consent. The proponent must ensure that any culturally sensitive information that should be accessed subject to conditions (eg. gender related cultural reasons) be identified in a separate letter accompanying the report.

Note: DECC may be required to produce a copy of a report provided to it in response to a lawful requirement. This request may occur, for example, as part of court proceedings or under freedom of information legislation. In providing a copy of any report which contains culturally sensitive information to which access is restricted, DECC will provide a copy of the letter setting out the restrictions and request that any person receiving a copy of the report take all reasonable precautions to comply with the specified access restrictions.

10. Where a condition of this permit and consent specifies either an event or due date by which something must be done or cease to be done, the proponent has a continuing obligation to comply with that condition after that date (subject to any written variation of that condition).

DICTIONARY

8.

9.

Aboriginal Community means those Aboriginal groups or individuals in the local area including those which registered an interest to be consulted during the community consultation undertaken for the project and any other Aboriginal group or individual which notifies the proponent of a wish to be consulted about the activities referred to in this permit and consent.

Aboriginal objects has the same meaning as in the Act

Act means the National Parks and Wildlife Act 1974

Archaeologist means archaeologist name or an alternative person appointed by the proponent in accordance with the conditions of the permit.

Consent means this consent issued pursuant to s.90 of the Act

Damage in relation to an Aboriginal object, means to knowingly damage, deface or destroy, or knowingly cause or permit the destruction or defacement of, or damage to, the Aboriginal object (unless otherwise specified)

DECC means the Department of Environment and Climate Change

DECC office means the Parramatta office; contact Lou Ewins, Manager Planning & Aboriginal Heritage Unit, Metropolitan Region ph: (02) 9995 6802 fax: (02) 995 6900

Disturb, when used in relation to land, includes causing land to be disturbed

Excavate, when used in relation to land, includes causing land to be excavated

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Human remains includes any remains that are reasonably suspected to be human remains, regardless of their origin

Land means the land described in Schedule B

Permit means this permit issued pursuant to s.87 of the Act

Proponent means Johnson Property Group

INFORMATION ABOUT THIS PERMIT AND CONSENT

Responsibility for obtaining all approvals and compliance with applicable laws

The proponent is responsible for obtaining and complying with all approvals necessary to lawfully carry out the work referred to in this permit and consent, including but not limited to development consents and any permits required under Part 3A of the *Rivers and Foreshores Improvement Act 1948* to carry out excavation near watercourses.

Exercise of investigation and compliance powers

Officers appointed or authorised under the Act may exercise certain powers and functions, including the power to enter land.

Entry to the land only with permission of owner or occupier

A permit or consent does not authorise the holder to enter or work on the land. Permission must be obtained from the owner or occupier.

Obligation to report newly identified Aboriginal objects

Nothing in this permit and consent affects the proponent's responsibility under s.91 of the Act to report newly identified Aboriginal objects.

Obligation to report Aboriginal remains

The proponent may have additional obligations to report any discovery of Aboriginal remains under the Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth).



Otarget Area for excavations



ATTACHMENT F14

Pump Station and Rising Main Review of Environmental Factors





Pitt Town Pump Station and Rising Main

Review of Environmental Factors

Johnson Property Group 09 July 2008

Pitt Town Pump Station and Rising Main

Prepared for

Johnson Property Group

Prepared by

Maunsell Australia Pty Ltd

Level 11, 44 Market Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia T +61 2 8295 3600 F +61 2 9262 5060 www.maunsell.com ABN 20 093 846 925

09 July 2008

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Quality Information

Document	Pitt Town Pump Station and Rising Main
Ref	60023107
Date	09 July 2008
Prepared by	Greg Tallentire, Paul Rossington, Dr Gillian Eckert
Reviewed by	Geoff Hudson

Revision History

Povision	Revision Date	Details	Authorised		
Revision			Name/Position	Signature	
			Geoff Hudson		
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Executive Summary

Johnson Property Group (the proponent) is developing a new residential area at Pitt Town approximately 60 km north-west of Sydney. This Review of Environmental Factors seeks approval from Hawkesbury City Council (HCC), as determining authority, under Part 5 of the *Environment Planning and Assessment Act* 1979 (EP&A Act) for the construction and operation of a sewage pumping station (WWPS PT1) and rising main (RM PT1). This infrastructure will have sufficient capacity to serve future staged development in the Pitt Town residential area as well as existing unsewered tenements.

Pitt Town is located in the Hawkesbury local government area, approximately 60 km north west of Sydney CBD. The proposed Pitt Town residential area is north of the existing village of Pitt Town and is surrounded by rural low density development to the west, north and east. The proposed pump station would be connected to Mcgraths Hill Treatment Works by a new 6.3 km rising main following the alignment of Bootles Lane, Cattai Road, Pitt Town Bypass Road (proposed) and Pitt Town Road. This route location has been chosen in order to minimise vegetation clearance required by co-locating the rising main within the road reserve of existing, proposed new and upgraded roads.

The key impacts of the proposal are clearance of native vegetation. Vegetation will be cleared chiefly along Bootles Lane and the proposed Pitt Town Bypass. This route was selected because these areas would ultimately be cleared of vegetation for proposed roadworks however impacts of clearance for the rising main are fully assessed in this REF as these planned roadworks are not yet approved. Threatened species occur in the vicinity of the rising main route. Redesign of the rising main route, hand excavation and a variety of other measures are proposed to minimise impacts in these areas. Under-boring would be used at creek crossings.

The activity would also have some minor, short-term impacts. These impacts would mainly result from disruptions to traffic, and general construction impacts such as noise and visual impacts.

Practical measures have been identified that would be implemented to mitigate potential adverse environmental impacts of the proposal with regard to threatened species, water quality and groundwater. With the adoption of the mitigation measures outlined in this document, it is anticipated that the identified construction impacts would have a minor effect on the local community and the environment. There are no long term impacts associated with the operation of the sewerage system apart from those associated with vegetation clearing in the alignment of the planned new and upgraded roads.

The implementation of this proposal would minimise environmental and public health risks associated with poorly performing existing on-site wastewater management systems. The proposed works would also augment the existing rising main, which is currently operating at or above its intended capacity. It is anticipated that the quantity of nutrients and pathogens discharged to the environment would also be significantly reduced

1.0 Introduction

Johnson Property Group (the proponent) is developing a new residential area at Pitt Town approximately 60 km north-west of Sydney (**Figure 1**). This Review of Environmental Factors (REF) seeks approval from Hawkesbury City Council, as determining authority, under Part 5 of the NSW *Environment Planning and Assessment Act* 1979 (EP&A Act) for the construction and operation of a waste water pumping station (WWPS PT1) and rising main (RM PT1) to serve future development at Pitt Town.



Figure 1 Locality map of Pitt Town

Source - NSW Department of Lands SIX Viewer © six.maps.nsw.gov.au Topographic maps (Current Series) - © Lands 2007

1.1 **Project Objectives**

The key objectives of the proposal are to:

- provide a reticulated sewerage scheme that will accommodate sewage flows for existing and future development in the Pitt Town residential area.
- integrate with the existing wastewater treatment infrastructure in the Hawkesbury City Council LGA.
- minimise impacts on flora and fauna by co-locating the rising main within the road reserve of existing, proposed new and upgraded roads and locating other works in areas that are already cleared.

1.2 Background to the Proposal

In 2002, Hawkesbury City Council commissioned and subsequently adopted a local environmental study (LES) for Pitt Town (Connell Wagner, 2003). Based on this LES, the Minister for Planning gazetted, in August 2006, an amendment (No 145) to the Hawkesbury Local Environment Plan which facilitates the development of an additional 631 housing allotments at Pitt Town. Also in August 2006, Johnson Property Group proposed a further draft LEP amendment in order to increase the development densities over land owned or controlled by JPG at Pitt Town. Hawkesbury City Council subsequently requested a Section 54 Certificate from the NSW Minister for Planning to place the draft LEP amendment on exhibition. The Minister declined to issue the Section 54 Certificate but, in September 2007, agreed to consider the proposal as a Major Project under Part 3A of the EP&A Act and authorized the submission of a Concept Plan.

The developer, Johnson Property Group (JPG), has commissioned the preparation of a sewerage strategy for this area (Maunsell, 2007) and proposes to construct a sewage pump station (WWPS PT1) and rising main (RM PT1) connecting Pitt Town to the Mcgraths Hill Wastewater Treatment Plant (WWTP). These works would service the Fernadell, Bona Vista, Blighton and Cleary precincts of the Pitt Town residential area (**Figure 2**). In addition, 230 equivalent tenements and a school in the existing Pitt Town Village will be served by the system.

By the final development stage described in the strategy, a total of 1287 equivalent tenements would be serviced.





1.3 Existing Sewerage Infrastructure

The proposed Pitt Town residential area, shown in **Figure 2**, is north of the existing village of Pitt Town and is surrounded by rural low density development to the west, north and east. The village of Pitt Town has a population of approximately 2500 people..Sewage from the village currently flows via a gravity sewer main to Pump Station "J" in Welleby Street Pitt Town and then via a 150 mm PVC diameter rising main to McGraths Hill Sewage Treatment Plant (STP) which is operated by Hawkesbury City Council..

Due to the area's topography, the proposed Pitt Town residential area is not able to be serviced by the existing 150 mm diameter PVC main to McGraths Hill STP. Some existing dwellings on the site are interlinked by a private sewer which is pumped to the gravity main. Other dwellings have night soil collection, or on-site disposal of sewage or septic tanks.

The McGraths Hill STP has a nominal capacity to treat sewage generated by 9,500 Equivalent Persons (EP) and currently operates at full capacity. Hawkesbury City Councill also operates the

larger South Windsor STP which has recently been upgraded to a nominal capacity of 27,000 EP. As part of a separate project, and not part of this REF, JPG in consultation with HCC is investigating options for transferring some of the load from McGraths Hill STP to South Windsor STP to allow for an increased load from the Pitt Town residential area.

Maunsell Australia Pty Ltd (Maunsell) has been engaged by JPG (the proponent) to prepare a Review of Environmental Factors (REF) for the proposal, to meet the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation). Approval for the activity is being sought from Hawkesbury City Council (determining authority) under Part 5 of the EP&A Act.

This Review of Environmental Factors (REF) has been prepared in accordance with Section 111 of the EP&A Act and the requirements of Clause 228 of the EP&A Regulation 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.

1.4 Structure of the REF

This REF is has been structured into nine chapters as follows:

- Chapter 1.0 Introduction introduces the project, states the project objectives and gives the background to the project.
- Chapter 2.0 Activity Description provides a detailed description of the proposed activity.
- Chapter 3.0 **Statutory Requirements** summarises the relevant statutory framework within which the project will be developed.
- Chapter 4.0 **Need for the Activity** establishes the objectives and need for the project and alternatives considered.
- Chapter 5.0 **Environmental Assessment** provides a description of the environmental characteristics in the vicinity of the proposed pump station and the main alignment of the proposed rising main and considers the likely construction and operational impacts on the environment. Recommendations to minimise the potential environmental impacts area also provided.
- Chapter 6.0 Environmental Management provides an outline of the environmental management measures to be implemented as part of the development of the project. The mitigation measures proposed as a result of the environmental assessment.
- Chapter 7.0 **Consideration of Environmental Factors** provides concluding commentary and a checklist illustrating consideration of environmental factors in relation to Clause 111 of the EP&A Act and Clause 228 EP&A Regulation.
- Chapter 8.0 **Conclusion** provides a summary of the REF and concluding Statements.

1.5 Consultation

Consultation regarding the potential impacts of the proposed works was conducted with Hawkesbury City Council (HCC), the Department of Environment and Climate Change (DECC) and the Department of Water and Energy (DWE). DECC was provided with a draft copy of the REF during the application process for the Environmental Protection License (**Appendix B**). DECC was contacted subsequently by email on 24/06/08 and by telephone on 04/07/08. The license has been issued and DECC has advised that they have no further comments.

DWE was provided with plans of the rising main location, showing proposed creek crossings and an environmental management plan for creek crossings during the application process for the Controlled Activity Approval (**Appendix B**). Subsequently, DWE was notified by email and telephone correspondence of the redesign of the rising main route south of Old Pitt Town Road. An excerpt from the REF regarding water quality and a copy of the draft REF was provided to DWE for comment.
DWE has advised that the Controlled Activity Approval does not need to be re-submitted and has requested a final copy of the REF for their records which will be provided after approval.

2.0 Proposal Identification and Description

2.1 Name and Location of Proposed Activity

The proposal assessed in this REF is the construction and operation of a sewage pumping station (WWPS PT1) at Pitt Town and a rising main (RM PT1) connecting the new pump station to the existing McGraths Hill Sewage Treatment Plant (**Figure 3**).

2.2 Local Government Area

The site of the Pitt Town pump station and rising main is within the Hawkesbury Local Government Area (LGA).

2.3 Funding for the works

The funding for the Proposal will be provided by Johnson Property Group, a listed public company. Both the pump station and rising main will be owned, operated and maintained by HCC.

2.4 **Proposal Description**

There are two major elements to the proposed activity (Figure 3):

- A sewage pumping station at Pitt Town
- A 6.3 km rising main following the alignment of Bootles Lane, Cattai Road, Pitt Town Bypass Road (proposed) and Pitt Town Road and connecting with the McGraths Hill Treatment Works.

These elements are described in the following sections.



Figure 3 Location of proposed Pitt Town pump station and rising main

2.4.1 Sewage Pump Station and Access Road

Drawings of the proposed pump station are provided in **Appendix A**. The proposed location for the pump station is on the south eastern corner of Lot 14 on DP 865977 bounded by Bootles Lane to the south. The land is owned by Bona Vista Properties Pty Ltd.





The sewage pump station will be made up of the following components:

- an upgrade of the existing access road to the pump station from Bootles Lane
- sewage pump station well pit approximately 6m external diameter, internal diameter 4.1m and approximately 9 m in depth
- valve pit approximately 3 m by 3 m with depth of approximately 1m
- a pipe connection between pump station and valve pit
- an above-ground electrical cubicle (1.8 m high x 3m x 5m), a recessive green in colour, on a 350mm thick concrete slab located above the 1:100 year flood level
- a 1.5 m deep absorption trench to capture overflows
- a chemical storage tank (2.2 m high x 1.85 m diameter) a recessive green in colour, on a 350mm thick concrete slab located above the 1:100 year flood level for the odour control facility, including associated bunding and stormwater control measures
- an automatic backup diesel generator to power the pump station during power failure.

In order to minimise the risk of sewage overflows, the pump station will include:

 emergency storage (in underground pipe) based on 30% of the daily ADWF for the ultimate development condition



 an alarm system notifying of water levels reaching the nominated maximum providing approximately 8 hours before an overflow would occur (based on ADWF from the stop level of the pump station).

2.4.2 Rising Main

The pipe diameter of the rising main is 450 mm and will be buried with a minimum depth of 1200 mm below finished ground level. Nine scour points will be located at low points along the rising main route. The rising main connects to the valve pit of the pump station at approximately 750 mm in depth.

The rising main will generally run parallel to an existing sewer rising main. The rising main will cross under the road at Pitt Town Road (at three separate locations), Pitt Town Bottoms Road, Ivy Avenue and Windsor Road (see **Appendix A**). The proposed rising main corridor traverses (from north to south) Pitt Town and Mcgraths Hill.

The 'construction corridor' required for typical open trench construction is approximately 10 m to 12 m wide. All construction activities will be undertaken within this corridor. A wider working width may be required at locations where the main changes direction.

The route of the rising main is largely confined to existing road reserve and public open space areas (**Figure 5** and **Figure 6**). The alignment of the rising main is described as follows:

- South along Johnstone Street
- South east along Bootles Lane to Cattai Road where it will cross Cattai Road to the eastern side
- Along Cattai Road between Bootles Lane and Buckingham Street the rising main is located on the eastern road verge
- From Cattai Road the rising main will traverse the proposed Pitt Town Bypass Road between Buckingham Street and Old Pitt Town Road.
- At Old Pitt Town Road the rising main will cross to the southern side of the road and head west for approximately 70 metres before crossing Hortons Creek and heading south through the edge of Brinsley Park.
- The route then enters the road corridor of Buckridge Street and heads south to the intersection of Bathurst Street and Pitt town Road where it again crosses Hortons Creek.
- Along Pitt Town Road the rising main will traverse the western side road verge between Hortons Bridge and Charles Street (north to south direction). This section of rising main will cross Pitt Town Bottoms Road and under McKenzies Creek
- At Charles Street the rising main will cross under Pitt Town Road to the eastern side of the road verge where it continues along Pitt Town Road adjunct to the existing rising main
- Under Windsor Road and follow the existing rising main alignment into the Mcgraths Hill STP

Apart from the Mcgraths Hill STP property, the rising main is located entirely within existing and planned road reserves and public open space.

Figure 5 Proposed corridor of rising main along Bootles Lane



Figure 6 Proposed corridor for rising main PT1 along Cattai Road



The rising main alignment follows the alignment of road widening along Pitt Town Road (between Pitt Town Bypass and the Windsor Road intersection) and the alignment of the proposed Pitt Town Bypass.

2.5 Construction Methodology

The installation of the pump station and rising main will involve the following key construction activities:

- Notification of affected property owners, the local community and other relevant stakeholders
- Site establishment.
- Erection of security fencing along the working width and the installation of safety measures
- Route marking.
- Vegetation clearing and grubbing works for natural surfaces.
- Stripping, separating and storing of topsoil, and preparation of the working width for natural surfaces.
- Excavation for the pump station components and pipe trench.
- Transporting of pipe lengths and laying them next to the trench on pipe 'skids'.
- Pipe laying in the trench and backfilling.
- Final clean-up and restoration/landscaping of the works areas.
- Purging and commissioning of the works.

These activities are described in the following sections.

2.5.1 Notification of Community

Prior to the commencement of construction in any locality along the works corridor, local residents and communities would be notified to inform them of working hours and duration of the works. Contact details of Community Liaison Representatives for the works would also be provided to the potentially affected parties.

2.5.2 Site Establishment

Prior to commencement of construction, the works main alignment and working width would be surveyed and 'pegged-out' to establish the precise alignment and extent of the working areas. This will need to carefully consider the site in relation to environmentally sensitive areas and also access to individual properties.

2.5.3 Temporary Fencing and Access

A variety of barriers can be used to define the work areas and direct vehicular traffic, pedestrians or cyclists around, through or past work areas. These types of barriers and their appropriate uses are described below:

- Barrier boards, which may have flashing yellow lights mounted on them, used to prohibit access to the ends of work areas, to prevent the use of a traffic lane or to guide pedestrians on footpaths. Barrier boards are placed perpendicular to traffic flows at a maximum spacing of 100 m. They are not used as delineation devices, i.e. placed parallel to traffic flow unless they are at least 4m clear of traffic flow.
- Plastic containment fences, to provide visible separation between pedestrians and vehicular traffic or the work area, when physical protection of a safety barrier is not warranted.
- Cones and bollards, used for short-term works to define the traffic path through or past the work area, while work is in progress and employees are present to reinstate any of the devices that are dislodged by traffic or wind. These are not used as a substitute for barriers and signs at either end of the work area.

- Pavement flaps would be used where a more forceful form of delineation is required to discourage vehicle movements at potentially hazardous locations, improve lane control or supplement barrier lines or painted medians.
- Guideposts are used for long-term works or for short-term works where a delineation device more permanent than bollards is required.

Open trenching would occur along the works corridor and the importance of maintaining pedestrian and vehicle access to adjoining properties throughout the duration of the work is recognised. Access for residents and emergency vehicles will be maintained at all times and will be detailed in a Traffic Management Plan (TMP) as part of the Construction Environmental Management Plan (CEMP) to schedule work and limit traffic and access disruptions. Changes to access arrangements will be communicated via written notice.

2.5.4 Trench Preparation

The required typical open trench construction area is approximately 10 m to 12 m wide and is the area within which all construction activities will be undertaken. A wider working width may be required at locations where the main changes direction. Environmentally and visually sensitive areas would be identified and a narrower working width established where practicable.

Existing utilities would be located, marked and safeguarded during construction. Overhead utilities such as transmission lines would be located and marked to avoid conflict with cranes and larger machinery. Temporary construction traffic crossing points would also be clearly marked.

Safe access to the working width by vehicles carrying heavy machinery and plant would be established in a TMP to be incorporated within the CEMP.

2.5.5 Clearing, Grading and Topsoil Stripping

In areas where natural surfaces will be traversed by WWPS PT1 and PT1 (i.e. grassed areas and areas of native vegetation), topsoil would be stripped from the working width.

Topsoil would be removed to subsoil level along the trench and stockpiled separately (i.e. topsoil and subsoil to be stored separately). Natural surfaces will have vegetation, topsoil and substrate removed and stockpiled separately from one another to enable more efficient restoration and rehabilitation during reinstatement. The topsoil will be stored to one side to prevent it mixing with subsoil or being damaged by compaction.

2.5.6 Excavation

2.5.6.1 Sewage Pump Station

The pump station pit will be excavated using excavators, with the exposed soil being stabilised by sheet piling to minimise the area of influence. The walls to the pump well would then be constructed using reinforced concrete wet well construction. Once the wet well walls are constructed, the sheet piles, would be removed and the external space backfilled. The valve pit and pipe connection to the pump station pit will be constructed using an open trench, which would not require sheet piling. The absorption trench adjacent to the pump station will be excavated to a depth of 1.5 m and filled with layers of gravel and soil.

2.5.6.2 Rising Main Trench

The rising main pipe trench will be constructed using open trenching techniques. Construction will occur at 6 major road crossings, which are

- Cattai Road, Pitt Town at Bootles Lane.
- Old Pitt Town Road, near Cattai Road intersection..

- Pitt Town Bottoms Road at Pitt Town.
- Ivy Avenue at McGraths Hill.
- Pitt Town Road at McGraths Hill.
- Windsor Road at McGraths Hill.

The pipe trench will be excavated using specialised plant. The sewer main will be installed at a minimum depth of 1.2 m depending on specific requirements of the location. In order to accommodate the 450 mm pipe, a trench approximately 850 mm wide by 1 m to 2.5 m deep would typically be excavated. These dimensions may be exceeded at certain locations to accommodate changes in direction, avoid existing utilities and/or subject to underlying geology. Larger 'bell holes' may be required where prefabricated bends or field bends will be installed and to allow for the in-situ joining of adjacent pipe strings.

Pipe trench excavation in areas of hard rock will generally be done using hydraulic excavators with rock rippers. Thrust boring would be used for pipe laying across all creeks with the exception of the crossing of Hortons Creek at Old Pitt Town Road. Either boring or trenching would be used in this location depending on site conditions during construction. Excavated material would be stockpiled separately from topsoil, to prevent mixing of subsoil and topsoil. The drilling fluid for boring will be bentonite or other non-toxic material and will require appropriate measures (i.e. bunding) to contain waste materials during drilling. Exact measures would be outlined as part of the CEMP. Excavated waste material will require the appropriate disposal subject to confirmation pending the development of a Resource and Waste minimisation Sub-plan, which would form part of the CEMP.

2.5.7 Pipe Work and Pipe Laying

Pipe sections will be delivered in to a series of 'pipe dumps' or site compounds located along the route by articulated trucks. Each pipe length will require a crane to lift it off the truck. Pipe lengths will be connected together on-site and in accordance with the *Sewage Code of Australia*.

Once the assembled main has been prepared, excavators, tractors or similar equipment fitted with side arms will be used to carefully lower the pipe sections into the excavated trench. A layer of granular sand or gravel would be laid around the pipe for protection.

2.5.8 Backfilling

Once the main has been laid and connected within the trench, backfilling works will be carried out. Firstly, inorganic fill material will be used to backfill the trench above the pipe. The remainder of the trench will then be backfilled using materials previously excavated from the trench, if this is considered to be suitable. Each layer will be compacted prior to application of the next layer.

Should excavated material be considered unsuitable for backfilling, suitable clean fill will be imported to the site and utilised. Excavated material not used for backfilling will be disposed of in an appropriately licensed waste facility in accordance with the provision of a Waste Management Plan (WMP).

2.5.9 Final Clean-up and Restoration/landscaping

This will include removal of all temporary construction equipment, reinstatement of site fences (if required), and removal of all rubbish and restoration of the works areas to pre-construction condition. Native screening vegetation will be planted around the pump station.

2.5.10 Purging

Pressure testing will be undertaken in accordance with Hawkesbury City Council's specifications. During commissioning, and in the event of suspected leaks during operation, town water will be flushed through a section of RM PT1. The water will then be collected by a water tanker for re-use. Town Water will not be discharged to local creeks.

2.6 Proposed Construction Hours

Construction will be limited to the following hours:

- 7am 6pm Monday to Friday
- 8am 1pm Saturday
- No works on Sundays or Public Holidays.

2.7 Temporary Construction Compound

The site for a temporary construction compound will be selected by the contractor on a cleared area with no native vegetation. This compound will provide site facilities including a storage area for machinery, materials, tools and fuel.

2.8 Operation

2.8.1 Pump Station

The pump station will be accessed frequently for checking and maintenance. There will be less frequent visits to top up chemicals.

2.8.2 Rising Main

In the case of suspected leaks, the rising main may require purging using town water. The water will then be collected by a water tanker for re-use. Town Water will not be discharged to local creeks.

3.0 Statutory Requirements

3.1 Introduction

The EP&A Act and EP&A Regulation provide the statutory context for assessment of the proposed sewage pump station and rising main. The proposal is to be assessed under the provisions of Part 5 of the EP&A Act with Johnson Property Group the proponent and Hawkesbury City Council the consent authority.

The EP&A Act is supplemented by a number of Environmental Planning Instrument's (EPIs) including:

- State Environmental Planning Policies (SEPPs)
- Regional Environmental Plans (REPs)
- Local Environmental Plans (LEPs)
- Other planning policies and guidance statements.

Relevant EPIs made under the EP&A Act, along with other relevant legislation, that apply to the proposed sewerage works are described in the following sections.

3.2 Approvals Process

3.2.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (SEPP Infrastructure) came into effect on 1 January 2008, which establishes the planning approvals path for infrastructure. In this regard, Clause 106 of Part 3, Division 18 – Sewage System states, in part, that:

"Development for the purpose of sewage reticulation systems may be carried out, by or on behalf of a public authority or any person licensed under the Water Industry Competition Act 2006, without consent on any land."

The proposed sewage pumping station and rising main works are within the meaning of 'sewage reticulation system' as defined by Clause 105 of SEPP Infrastructure because a:

'Sewage Reticulation System means a facility for the collection and transfer of sewage to a sewage treatment plant or water recycling facility for treatment, or transfer of the treated water for use or disposal, including associated:

- (a) Pipelines and tunnels, and
- (b) Pumping stations, and
- (c) Dosing facilities, and
- (d) Odour control works, and
- (e) Sewage overflow structures, and
- (f) Vent stacks.'

Based on advice provided by Greg Moore, of the Johnson Property Group (JPG), it is understood that the proposed sewage pumping station and the associated rising mains are to be constructed by JPG and that the works, upon completion, will be dedicated to Hawkesbury City Council. In addition, the works will not traverse any land reserved under the *National Parks and Wildlife Act 1974 (NPWS Act)*. Having regard to the above, the proposed works are deemed to be being carried out on behalf of a public authority, namely Hawkesbury City Council, and do not affect reserved land under the *NPWS Act*, and as such under Part 4 of the EP&A Act are permissible without consent on any land under the provisions of SEPP Infrastructure. Approval is therefore required under Part 5 of the EP&A Act.

3.2.2 Assessment Requirements

As the works are within the Hawkesbury City Council local government area, Council will be the determining authority under Part 5 of the EP&A Act. Having regard to the applicability of SEPP Infrastructure Hawkesbury City Council is required to assess the impacts of the proposal on the environment in accordance with the provisions of Section 111 of the EP&A Act, which states *"to take into account to the fullest extent possible all matters affecting or likely to affect the environment by reasons of that activity".*

This REF has been prepared to address the duties of Section 111 of the EP&A Act and the requirements of Clause 228 of the EP&A Regulation, which detail the factors that must be taken into account when assessing the impact of an activity on the environment.

It should also be noted that where an inconsistency may arise SEPP Infrastructure prevails to the extent of that consistency over all other environment planning instruments (SEPPs, REPs and LEPs) with the general exception of:

- State Environmental Planning Policy (Major Projects) 2005
- State Environmental Planning Policy No. 14 Coastal Wetlands
- State Environmental Planning Policy No. 26 Littoral Rainforests.

Notwithstanding, the planning policies identified above do not apply to the land on which the proposed sewage pump station and rising main will be located.

Because SEPP Infrastructure allows the proposed sewage pump station and rising main to be carried out without the need for development consent, the proposal is subject to environmental impact assessment under Part 5 of the EP&A Act.

Matters for consideration are assessed through the preparation of a formal environmental impact assessment, whether in the form of an REF or an Environmental Impact Statement (EIS). An EIS is required if the proposal is "likely" to impose "a significant effect" on the environment. This REF has been prepared to review the relevant considerations and to determine whether there is a likelihood of the proposed activity generating a significant impact on the environment as a result of proposed rising main and sewage pump station. Assessment of the nature of the study area and the nature of the proposed works indicates that the proposal is not "likely" to have "a significant effect" on the environment.

A checklist against the criteria as stipulated in Clause 228 of the EP&A Regulation has been provided in **Section 7** of this report, to demonstrate consistency with both the EP&A Act 1979 and the EP&A Regulation 2000.

The following sections describe the relevant requirements of applicable planning instruments, in the context of the established approval process.

3.3 Hawkesbury Local Environmental Plan 1989

The proposal traverses land within the Hawkesbury local government area, where the development of land is regulated by environmental planning controls administered by Hawkesbury City Council. Notwithstanding the provisions of SEPP Infrastructure, the primary local EPI controlling development at the subject site would normally be the *Hawkesbury Local Environmental Plan* (LEP 1989).

3.3.1 Land Use Zoning

The land use zonings for the proposed works are shown in **Figure 7** and **Figure 8**. The location of works is shown in **Figure 9**. As demonstrated, the majority of the works are located within the existing road reserve. Three components of the works however fall outside the existing road reservation,

namely the Pump Station and a portion of the rising main works between Cattai Road from Buckingham Street to Glebe Road and those located between Old Pitt Town Road and Buckridge Street which traverse Brinsley Park. These components are described in the following subsections.

The proposed sewage pump station is situated on land that is identified on zoning Map as:

• Environmental Protection – Agriculture Protection (refer to Figure 7).



Figure 7 Land zoning for pump station

The rising main is situated on land that is identified on the zoning Map as:

- 9(b) (Proposed Road) Zone Pitt Town Bypass (runs from the Cattai Road and Buckingham Street intersection to Pitt Town Road)
- Unzoned land (where the rising main is located within the existing road reserve).

The proposed rising main will run parallel to the existing road network and is partially located within the existing utilities easement, which is in the benefit of Hawkesbury Council. The rising main travels along Bootles Lane to Cattai Road, then runs within the proposed 9(b) Road reservation to Wellesley Street and then traverses Glebe Road to Pitt Town Road. From this point the rising main traverses Windsor Road down to Mulgrave Road where it connects to the existing STP at McGraths Hill









The third section of the rising main which is located outside of the road reserve traverses Brinsley Park which is zoned 6A Open Space (Existing Recreation).



3.3.2 Land Use Zone Objectives

The objectives of the 7(d) Environmental Protection – Agriculture Protection (Scenic) Zone are generally to "protect the agricultural potential of rural land to preserve and encourage agricultural production" and "to ensure that development retains or enhances existing landscape values".

The electrical cubicle of the proposed pump station will be 1.8 m high on a 350mm thick concrete slab. The erection of the pump station however will not interrupt agricultural production, provide a conflicting land use or detract from the existing landscape values. The green colour of the electrical cubicle will adequately blend with the surrounding environment. In addition, endemic plantings will be employed to further screen the structure. As such, the pump station and associated electrical cubicle are considered to be consistent with the objectives of the '*Environmental Protection – Agriculture Protection (Scenic Zone)*'.

The objective of the 6(a) Open Space (Existing Recreation) zone is generally to *'identify existing publicly owned land that is used or is capable of being used for active or passive recreational purposes and encourage the development of public open space in a manner which maximises the satisfaction of the community's diverse recreational needs' The rising main will be subgrade and as such would not prevent the intended use of this parkland on a permanent basis (excluding temporary construction phase).*

The objective of the 9(b) (Proposed Road) zone is 'to set aside land (being land that the Council or another public authority proposes to acquire) for various proposed roads.'

It is standard practice to locate services within the road corridor and such location of services within the reserve would not impede the provision of a road pavement over the subject land. As such, the location of the rising main within the road reservation is not considered to inconsistent with the objectives of this zone.

Notwithstanding, Clause 5 of HLEP defines a 'public utility undertaking' as:

"any of the following undertakings carried on or permitted or suffered to be carried on by or by authority of any government department or under the authority of or in pursuance of any Commonwealth or State Act:

- a) railway, road transport, water transport, air transport, wharf or river undertakings,
- b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services,
- c) telecommunication facilities undertakings,

and a reference to a person carrying on a public utility undertaking shall be construed as including a reference to a council, county council, government department, corporation, firm or authority carrying on the undertaking."

In accordance with the above definition, the proposed rising main and sewage pump station are providing for **sewerage services** which will be dedicated to Council upon completion and consequently are defined as a public utility undertaking. Pursuant to the provisions of Clause 9 of HLEP, public utility undertakings do not require development consent in any zone. Consequently, no further consideration of the provisions of LEP 1989 is required.

3.4 Sydney Regional Environmental Plans

Under Clause 11(17) of Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2 – 1997) (SREP 20) consent is required for "any sewerage system or work which stores, treats or disposes of sewage (including domestic on-site disposal systems that are ancillary to development which requires consent) but not including a public utility undertaking".

As the proposed works are a public utility undertaking, SREP 20 does not impose a requirement for development consent.

Under Clause 5 general planning considerations must be taken into account as part of the assessment of a public utility undertaking, as described in **Table 1**.

General Planning Consideration	Response
The aim of this plan and the strategies listed in the Action Plan of the Hawkesbury-Nepean Environmental Planning Strategy.	The proposed works will provide sewage disposal infrastructure for new dwellings in the Pitt Town area.
Whether there are any feasible alternatives to the development or other proposal concerned.	The proposed pump station location and the alignment of the rising main along existing and proposed road corridors has been designed to minimise the need for clearing of vegetation. The works are located to maximise the ability to construct the rising main concurrently with road upgrades, thereby minimising the cumulative impact of excavations on the community and natural landscapes.
The relationship between the different impacts of the development or other proposal and the environment, and how those impacts will be addressed and monitored.	Impacts of the proposed works are described in Section 5 of this report, with mitigation measures summarised in Section 6.

Table 1 General planning considerations under SREP 20

Under Clause 6 of SREP 20 specific planning considerations must be taken into account as part of the assessment of a public utility undertaking, as described in **Table 2**.

Table 2	Specific planning	considerations	under	SREP	20
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Specific Planning Consideration	Response
Total catchment management	The proposal is not likely to have a significant adverse environmental effect on surrounding local government catchments. The overall cumulative environmental impact of the development proposal is considered to be positive.
Environmentally sensitive areas	While the proposed works are primarily underground the project requires at grade works. The at grade works and on ground preparation will not have a significant adverse impact on environmentally sensitive areas provided the mitigation measures recommended as part of this REF are implemented.
Water quality	With the implementation of mitigation measures outlined in Section 6, the proposal would not have any adverse impacts on water quantity.
Cultural heritage	Previous evidence of Aboriginal heritage values has been found in the general area. Where such evidence is found on the site affected by the works, they will proceed only with necessary consents under relevant legislation.
Flora and fauna	The key potential ecological impacts of the proposed action are those that could affect the following species and ecological communities; Cumberland Land Snail <i>Meridolum</i> <i>corneovirens</i> , Shale Gravel Transition Forest and Downy

Specific Planning Consideration	Response
	Wattle Acacia pubescens.
	Tests of significance (7-part tests) have been conducted for each of these and have concluded that no significant negative impact on these species is likely to occur as a result of the proposal. None of the other threatened or migratory species considered likely to occur in the vicinity would be significantly affected by the proposed activity due to their highly mobile nature, the limited impact of the proposed action and the mitigation measures to be implemented.
Riverine scenic protection	The proposed works are primarily underground and will not have an adverse impact on visual amenity. However, the electrical cubical of the pump station and the odour control facility will be above ground. As noted earlier, the recessive green colour of the electrical cubicle and odour control facility in conjunction with the planting of endemic species will ensure that the pump station adequately blends with the surrounding environment.
Agriculture/aquaculture and fishing	The proposal does not have any adverse impacts on land that is important for agricultural production.
Rural residential development	NA
Urban development	NA
Recreation and tourism	NA
Metropolitan strategy	NA

3.5 **NSW Legislation**

3.5.1 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) outlines the protection of threatened species, communities and critical habitat in NSW. The Act is administered by the Department of Environment and Climate Change (DECC). Section 91 of the TSC Act requires that a license be obtained should a development result in one or more of the following:

- Harm to any animal that is of, or is part of, a threatened species, population or ecological community
- The picking of any plant that is of, or is part of, a threatened species, population or ecological community
- Damage to critical habitat
- Damage to habitat of a threatened species, population or ecological community.

In accordance with section 5A of the EP&A Act, a Seven Part Test would be undertaken to determine the significance of the effect on a particular species or EEC. Should this determine that the project would result in a significant impact on the threatened species, population or EEC then a Species Impact Statement (SIS) would be required. Concurrence would be required from the Director General of the Department of Environment and Climate Change. Accordingly, a copy of the REF and associated assessments under the NSW TSC Act will be forwarded to the DECC.

Based on the outcome of Seven Part Tests, the current project has the potential to impact upon EEC's listed under Schedule 1 of the TSC Act but the impact is not likely to be significant and a SIS is therefore not required.

3.5.2 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) regulates the clearing of all native vegetation on land in NSW except land listed under Schedule 1 of the Act. Excluded land includes land in the local government area of Hawkesbury in the urban area of Sydney. Since the project falls within this local government area, the NV Act does not apply.

3.5.3 National Parks and Wildlife Act 1974

The purpose of this the *National Parks and Wildlife Act 1974* (NPW Act) is to provide the primary basis for the prevention of the unwarranted destruction of relics of high cultural significance – both Indigenous and non-Indigenous value and their protection. In addition, the NPW Act also provides a framework to conserve native terrestrial flora and fauna species and manage areas of conservation value such as Nature Reserves, which includes:

- a Section 87(1) permit may be required to conduct preliminary research or excavate any potential archaeological deposits and relics located along the works corridor
- a Section 90(2) Permit (i.e. consent to destroy) may be required to disturb, destroy, deface or damage any relic, sites or Aboriginal Places
- it is an offence to harm, trade, possess or damage critical habitat or the habitat of any threatened species without obtaining a Section 120 licence.

DECC also provides guidelines for standard archaeological reporting and assessment (NPWS 1997). These guidelines are currently being updated and are in draft form (NPWS 2003).

The NPW Act requires that a permit from the Director General be obtained before archaeological fieldwork involving disturbance to an Aboriginal site is carried out. Queries and applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork, should be directed to the Cultural Heritage Unit Manager at the relevant DECC Aboriginal Heritage Division regional Office.

3.5.4 Heritage Act 1977

The *Heritage Act* 1977 (Heritage Act) provides a framework of protection to non-Indigenous heritage items listed on the State Heritage Inventory, namely any "*deposit or material evidence which relates to the settlement of an area (not being Aboriginal settlement) and exceeds 50 years old*", as per Section 139.

Four non-Indigenous heritage listed sites are located within 200 m of the pump station and rising main however these will not be impacted by the proposed works (see **Section 5.8**).

3.5.5 Waste Avoidance and Resource Recovery Act 2000

The *Waste Avoidance and Resource Recovery Act 2000* (WARR Act) provides a framework to identify and implement the most efficient use of resources in order to reduce the potential for environmental harm arising from the generation of waste. Waste management objectives contained within this REF have been designed to address the generation of waste through application of the waste hierarchy.

The construction contractor would be required to conform to the provisions of this Act in relation to waste management during construction and by adopting the Resource Management Hierarchy principles (in order of priority) of Avoidance, Resource Recovery and Disposal.

3.5.6 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides a framework of protection for the extraction of water and structural change to existing watercourses. More specifically, the Water Management Act 2000 provides that certain types of development and activities that are carried out in or near a river, lake or estuary are controlled activities. A controlled activity includes the following:

- the erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or
- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or
- the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

Section 344(1)(a) requires that a person must not carry out a controlled activity in, or under waterfront land otherwise than in accordance with a controlled activity approval (CAA). The proposed rising main works are within 40 m of Hortons and McKenzies watercourses and therefore require a CAA under the WM Act.

On 4 February 2008 an application was made to the Department of Water and Energy to obtain a Controlled Activity Approval (CAA) issued under '*Part 3 – Approvals*' of the WM Act. On 7 March 2008 the CAA was issued by Department of Water and Energy (Appendix B). The CAA permits the proponent to undertake works for a sewer main on waterfront land for McKenzies, Horton Creeks and tributary of Hawkesbury River- Pitt Town and McGraths Hill, NSW. The CAA is issued for a period of five years and expires on 7 March 2013. Conditions in the CAA should be incorporated during project execution.

3.5.7 Fisheries Management Act 1994

The *Fisheries Management Act 1994* and *Fisheries Management Amendment Act 1997* provide for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Permits are required for any dredging or reclamation works, any harm to marine vegetation or any obstruction to fish passage. The proposal will not affect aquatic ecosystems and no permits are required under either of these Acts.

3.6 Commonwealth Legislation

3.6.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) governs the Commonwealth Environmental Assessment process and provides protection for matters of National Environmental Significance (NES), which include:

- Nationally threatened species and ecological communities
- Australia's World heritage properties
- Ramsar wetlands of international importance
- Migratory species listed under the EPBC Act (species protected under international agreements)
- Commonwealth marine areas
- Nuclear actions, including uranium mining
- National heritage.

The EPBC Act is separate from other approvals (such as those under the *Threatened Species Conservation Act 1995*).

Given the outcomes of the ecological investigations conducted as part of this REF, together with consideration of the above guidelines, it is unlikely that there will be a significant impact to protected matters listed under the EPBC Act and therefore a referral to Department of Environment, Water, Heritage and the Arts (DEWHA) for information is not required.

3.6.2 Native Title Act 1993

The *Native Title Act 1993* administers processes relating to the recognition, protection and determination of native title and dealings with native title land. Native title is concerned with the rights and interests of Aboriginal and Torres Strait Islander peoples in relation to land and water in Australia and its territories. This Act is administered by the Commonwealth DEWHA.

If Crown Land is involved then a Native Title referral is required. Advice regarding Native Title was sought from an independent heritage consultant.

This advice indicated that no Native Title claims were discovered during database searches of lands affected by the proposed development and that no Crown Land was believed to be potentially affected by the proposed development.

3.6.3 Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987

The Aboriginal and Torres Strait Islander Heritage Protection Amendment Act 1987 (ATSIHP) is a Federal Act that provides protection for Aboriginal and Torres Strait Islander heritage in circumstances where such protection is not available at a state level. This Act comes under Commonwealth jurisdiction which means that it can override state and territory provisions.

Notwithstanding, the land is subject to the provisions of the NSW Heritage Act 1977 in conjunction with those contained in the Hawkesbury Local Environmental Plan 1989 (as amended). Further, an independent Aboriginal Archaeological Heritage Report has been prepared in relation to this proposal and can be viewed in Appendix F. Accordingly, it is considered that adequate consideration has been afforded to indigenous heritage within the project area in this instance and that the provisions of the ATSIHP do not require further consideration.

4.0 Need and Alternatives

4.1 Project Need

The project is required to transfer sewage generated from the Fernadell, Bona Vista, Blighton and Cleary precincts of the Pitt Town Residential area to McGraths Hill STP. If fully implemented, this residential development would include 675 sewered dwellings. Nevertheless, the proposed infrastructure has been sized to service an equivalent of 1270 dwellings (including a school) based on an average of 3 persons per dwelling with each person generating 240 Litres per day of wastewater. This sizing includes capacity for expected future development in Pitt Town as well as future connection of existing unsewered properties that are currently on septic and properties that are currently serviced by private sewer (**Section 1.43**).

The existing gravity main connecting the village of Pitt Town to McGraths Hill STP does not have the capacity to carry the flow from the new development because the topography of the area would not allow sewage from the Pitt Town residential area to be conveyed by gravity. A pump station is therefore required to pump sewage from the proposed Pitt Town residential development to a sewage treatment plant. As a result, a new pump station and 6.3 km of rising main is required along a corridor within the Pitt Town and McGraths Hill area in order to connect into McGraths Hill sewage treatment works to the south west of the new works. The works would accommodate future development extensions as the area is progressively developed to incorporate a proposed release of land for housing. Only when PS "C" and RM "C" is diverted away from the MHSTP towards the SWSTP freeing up capacity.

4.2 Assessment of Alternatives

4.2.1 Do-nothing Option

The Pitt Town residential area is currently rural land use with no reticulated sewerage system. The pressure sewer rising main connecting the existing village of Pitt Town to McGraths Hill STP does not have the capacity to service the new development. The option of doing nothing would not allow for the planned residential development or any future development in the area and was therefore discounted. 'Doing nothing' would also mean that existing dwellings serviced by septic tanks and nightsoil collection would not be sewered.

4.2.2 Pump Station

Because of the topography of the area, it is not possible to convey sewage from the Pitt Town residential area by gravity. A pump station is required to pump sewage from the proposed Pitt Town residential development to a sewage treatment plant. The site for the pump station was selected, within the land controlled by JPG, that was already cleared of vegetation and had a cleared access way. No further options were considered for siting the pump station.

4.2.3 Rising Main Route

A rising main is required to transport the sewage from the pump station to a STP. McGraths Hill is the closest STP to Pitt Town. This STP is currently at capacity and does not have the capacity to treat the sewage that would be generated by the Pitt Town Development. Two alternatives were considered:

- pipe the sewage from the proposed Pitt Town development to the South Windsor STP which has excess capacity
- pipe the sewage to McGraths Hill and undertake works to increase this STP's capacity to accept sewage from Pitt Town (e.g. upgrade, pump to South Windsor).

These strategies were investigated by Maunsell as part of the revised Pitt Town Sewerage Strategy and Design project.

Piping the sewage from Pitt Town directly to South Windsor STP would cause serious septicity problems and require very large pumps of a size that were not acceptable to Hawkesbury City Council. Consequently, the preferred option was to pipe the sewage to McGraths Hill STP. The route to the STP was selected to follow the route of existing and planned roads in the area in order to minimise environmental impacts.

As part of a separate exercise, JPG has investigated several options for obtaining adequate treatment capacity for the increased sewage load. The preferred option at present is construction of a pump station "C", within McGraths Hill STP, and construction of a rising main "C" to South Windsor STP.

5.0 Environmental Impact Assessment

5.1 Topography, Geology and Soils

5.1.1 Existing Environment

Pitt Town is in a semi-rural area characterised by farming land. The study area lies to the north of the town centre. The surrounding landscape slopes gently away from the site towards the east and south. The topography of this site for the proposed pump station is relatively flat, with the site grade falling gently in a north-west to south-east direction. This area is comprised of native bushland. The topography of the route of the proposed rising main is also relatively flat, with a slight grade falling in a south-west direction.

The 1:50,000 geology sheet for Windsor indicates that the site locality is underlain by Tertiary deposits with a verity of materials including sand and loam, clay, claystone and sandstone, conglomerate, laterite, and lateritised gravel.

A geotechnical investigation has been carried out by Golder Associates and a report issued; *Geotechnical Investigation Proposed Residential Development Pitt Town, NSW (RCA document Number 05623002/12)* dated June 2005. (**Appendix C**). The report discusses the geotechnical investigation of the pump station site in relation to the proposed works. Based on the information available, it can be deduced that.

- Ground condition is relatively consistent across the study site.
- Soils generally compromise of sand and clay mixtures.
- Bedrock was not encountered with the depth of investigation.
- The eastern half of the site the profile is predominantly clay with a variable surficial layer of silt and sand.
- Seepage was encountered to a depth of 0.7m 2 m in several of the test pits.
- The site of the proposed works would not be located in an area subject to landslip.

Contamination investigations indicated there would be a low risk of buried materials (such as underground tanks or potential fill). However, the Pitt Town LEP identifies that the Pitt Town area was used for orcharding and such areas would have a high likelihood of pesticide contamination in soils. During construction, soils will be disturbed and replaced but no soil is proposed to be removed from the site. The construction EMP should assume that all soils may contain pesticides and contain appropriate safe working procedures. No soil should be removed from site without testing and should be disposed of in accordance with the appropriate regulatory guidelines.

There are no known acid sulfate soils on the site. If a change to the scope of works is required and the potential for acid sulfate soils or contamination arises, a management plan will be developed to ensure compliance with DECC requirements.

5.1.2 Potential Impacts

The proposed works have the potential to cause minor erosion of soils during construction particularly through the movements of the construction machinery, private vehicles and personnel, and can be further exacerbated by heavy rain.

Potential soil erosion impacts can be prevented and controlled through the implementation of appropriate measures as outlined in **Section 5.1.3**.

5.1.3 Mitigation Measures

The following mitigation measures would be implemented to reduce erosion and sediment loss:

- Erosion and sedimentation control devices would be installed prior to excavation of the site. Erosion and sediment control measures would be in accordance with the requirements of the Council and Landcom *Managing Urban Stormwater; Soils and Construction* Manual 2004 prior to any works commencing at the site and will be maintained for the duration of the approval to prevent any sediment and contaminated water entering waterways.
- Erosion controls would remain in place until the bare soils and surfaces are stabilised (by revegetation or other means) and removed when redundant. This needs to include the diversion of 'clean' water around site in order to avoid treating it and also to avoid potential additional erosion from off site sources.
- Appropriate erosion and sediment control devices would be placed downslope of all excavation works, spoil stockpiles or works that would disturb the ground surface, downslope of access roads that are highly utilised and in other areas as appropriate.
- The area to be disturbed by construction activities would be minimised as far as possible.
- Embankments and other areas subject to earthworks and grading would be revegetated with an appropriate cover crop as soon as possible following achievement of final levels. Where feasible, locally Indigenous plant species, including shrubs and groundcovers, would be planted in appropriate locations to assist in soil stabilisation following completion of construction. Maintenance of these plantings would include regular watering and appropriate weed control to ensure the plants survive and continue to enhance the site.
- Daily visual inspections of erosion and sediment control devices to determine the condition and effectiveness of control measures. Immediate action would be taken to fix any control devices that have failed to work adequately.
- Disturbed areas would be restored to original condition (vegetated, as appropriate) upon the completion of the works in that area.
- Earthworks would be avoided or minimised during wet weather, in order to minimise waterinduced soil erosion and increased sedimentation to the surrounding environment.

5.2 Hydrology and Water Quality

This section covers flooding, surface water quality and groundwater.

5.2.1 Existing Environment

5.2.1.1 Surface Water

The project is within the Upper Hawkesbury River sub-catchment of Hawkesbury-Nepean River. Water quality in the river has been severely impacted by urban development. The Pitt Town LES summarized existing water quality data from the Hawkesbury River, upstream and downstream of Pitt Town. The data showed that compliance for major recreational areas such as swimming and boating was very poor in some parts of this section of river due to high levels of faecal coliforms and/or chlorophyll-a, whereas compliance to secondary contact recreation value was 'fair'. Compliance with aquatic ecosystem value across the sub-catchment was 'very poor' to 'fair'. The key water quality issues of concern in this area are algal blooms in this area of the river. The causes are due to poor flushing of the river (due to water extraction upstream) and high continuous nutrient inputs from upstream sources such as South Creek and to a lesser extent Cattai Creek.

The waterbodies with the potential to be affected by the activity are Horton's Creek, Pitt Town Lagoon and McKenzies Creek all of which are in the floodplain of the Hawkesbury-Nepean River.

The pump station and part of the rising main route are in the catchment of the Pitt Town Lagoon. This seasonal freshwater wetland is protected by SEPP 14 NSW legislation and is considered to be a wetland of national importance, being habitat for threatened and migratory bird species.

The rising main crosses Hortons Creek which is a tributary of Pitt Town Lagoon and then crosses the Hawkesbury Floodplain and McKenzies Creek which drains to the Hawkesbury Nepean River. Given the rural nature of the area, the creeks would be expected to be degraded to some extent by agricultural activities and exhibit elevated suspended solids, nutrients and turbidity. Elevated salinity in some areas is possible due to the underlying Wianamatta Shales which have naturally high salinity and the high groundwater table.

5.2.1.2 Groundwater

There is limited information on groundwater in the Pitt Town area. The Pitt Town LES indicated that the salinity of the groundwater was likely to be elevated and there were localised areas of high water table. The LES reported on a study on the Fernadell and Bona Vista properties by Golder Associates that identified ground water to be from 0.2 m below the surface in drainage lines to about 1 m below the surface for the majority of the two properties. The geotechnical study undertaken for this project by (**Appendix C**). encountered seepage to a depth of 0.7 m – 2 m in several of the test pits.

5.2.1.3 Flooding

The widespread flooding and flood behaviour of the Hawkesbury-Nepean valley presents a significant risk to persons and property in the region. The Hawkesbury-Nepean Flood Emergency State Plan establishes the framework for flood evacuation and the State Emergency Services' position is that the existing flood risk should not be increased by development.

5.2.2 Potential Impacts

As detailed in the Project Description, open trenching is the preferred construction method for the majority of the rising main. HDD techniques will be employed to cross under watercourse crossings.

5.2.2.1 Surface Water Quality

Construction may potentially impact on local surface water through:

- An increase in soil erosion and generation of sediment-laden runoff during open trenching and preparation of HDD has the potential to effect water quality within the catchment.
- Accidental spillages of chemicals/fuel by construction plant and equipment which may leach into underlying groundwater or 'wash-out' into adjacent and downstream drainage channels.
- Water collected from pipe trench dewatering has the potential to flow into adjacent drainage channels.

A management plan for surface water will be prepared as part of the CEMP

5.2.2.2 Sewage Overflow

The sewage pumping station will maintain a stand by pump as a backup in case one of the main duty pumps fail. The pump station will also include an alarm system which will notify Council operation personnel if the pumps fail or if there is a power failure. In a situation where there is a power failure a backup generator nearby can be easily switched over to and will be used to run the pumps. Also the proposed sewer carriers will have the capacity to carry 8 hours of dry weather flow, in case of an emergency overflow.

5.2.2.3 Groundwater

Shallow and possibly saline groundwater may be intercepted along sections of rising main during excavation of the pipe trench and dewatering may be necessary. Saline groundwater could cause scalding of vegetation of adverse impact on waterways if discharged. The newly laid main may

potentially create an alternative drainage pathway and alter groundwater flows if appropriate measures are not installed along the main to maintain unabated transverse (cross-flows) groundwater flows.

As the contents of the rising main are under pressure, no infiltration of groundwater into the rising main would occur. Saline groundwater, if it occurs within the rising main route would not affect sewerage infrastructure. The mains that would be laid in carriageways and road shoulders would be filled with a sand-cement mix that does not include steel re-enforcing. Damage to sewerage assets would not occur due to any saline ground conditions that may be present.

5.2.2.4 Flooding

Since all works except elements of the pump station and odour control facility are below ground, the proposed project will have no effects on flooding.

5.2.3 Mitigation Measures

5.2.3.1 Construction Phase

Mitigation measures will be required to prevent any impacts on Pitt Town Lagoon. Appropriate erosion and sedimentation controls, as specified in Section 6.1.3, to be implemented during construction incorporate the following measures. A Soil and Erosion Sub-plan would be required to be prepared as part of the CEMP. Mitigation measures proposed to minimise potential impacts on the surrounding water environment during the construction of the works will include:

- Controls as specified in the Soil and Erosion Sub-plan would be required to be developed for incorporation into the CEMP.
- HDD pits will be located away from high erosion hazard soils and steep slopes where possible.
- Stormwater and other surface water flows will be diverted away from open trenches using straw bales or other similar temporary barriers where practicable.
- Stockpiled topsoil and subsoil will be located outside the 40 m buffer zone of any watercourse.
- Water collected during trench dewatering (from surface water and groundwater seepage) will be contained and tested prior to disposal in accordance with provisions within the CEMP. Saline groundwater will not be released to the environment.
- Groundwater cross-flows and alteration of the underlying hydrogeology that may result from the installation of the rising main will be managed through the use of impermeable clay plugs or sand bag 'trench breakers' at key locations.
- Handling of oils and fuels and the washing of all equipment, including all concreting equipment, would be undertaken within bunded areas or containers in accordance with DECC Bunding and Spill Management Guidelines.
- Onsite refuelling if required will be conducted in accordance with a Refuelling Management Plan (RMP). The RMP will include a risk assessment for fuelling of all plant including consideration of the following as appropriate:
 - Appropriate refuelling locations.
 - Proximity to infrastructure.
 - Hoses.
 - Couplings.
 - Bunding.
 - Track matting.
 - Spill kits.
 - Monitoring.
 - Fill volumes.
- The EMP would include work methods to safeguard against hazards such as spills. Any fuel spillage would be reported, documented and immediately remediated. Collected contaminated material will be disposed of as per DECC waste guidelines.

• The conditions in the Controlled Activity Approval (CAA) would be adhered to (refer to **Appendix B** for details).

5.3 Climate and Air Quality

5.3.1 Existing Environment

The nearest Bureau of Meteorology (BoM) monitoring station to the Project is located at Richmond RAAF approximately 20 km away. Meteorological data collected from the station is considered to be representative of climatic conditions experienced in the study area and has been used as the basis for this climate study.

5.3.1.1 Climate

The western parts of Sydney generally experience a relatively mild climate. The summer months experience warm to hot days, winters are cool to cold.

5.3.1.2 Rainfall

Rainfall levels recorded around the study area vary throughout the year with a median monthly rainfall ranging from 35.9 mm in July and September up to 105 mm in February. The total mean annual rainfall¹ for the area is 782.7 mm. The mean number of days of rainfall per month varies between 4 and 7.5 in this area.

5.3.1.3 Wind Speed

Wind speed increases during the spring and summer months at the station. There is also a noticeable increase in wind speed during the 3 pm periods compared to the morning period. The maximum monthly average occurs in December.

5.3.1.4 Existing Local Air Quality

Local air quality is influenced by many factors including topography, meteorological conditions and surrounding land use.

The meteorology and topography of the Sydney Basin combine to influence air movement conditions where certain areas such as the western portion of the basin act as a 'sink' for airborne pollutants. This 'sink' effect usually occurs at night-time under light wind conditions and clear skies as denser air travels downwards from surrounding areas of high ground to the north, west and south, or alternatively daytime sea breezes also return and recirculate airborne pollutants (under certain wind conditions) to settle in the western parts of the Sydney Basin.

Background air pollutant concentrations including Carbon (CO), Nitrogen (NO2) and particulate matter (PM10) have been extracted (refer to) from the Richmond air quality monitoring site located in the inside the campus of the University of Western Sydney, Hawkesbury. It is situated in the north of the Hawkesbury basin in a residential/semi-rural area and is at an elevation of 21 m. This site is the most representative of the study area available.

¹ The sum of monthly mean rainfall

Pollutant	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	NEPM Standard
CO (ppm)	4.9	4.2	4.5	4.7	3.5	3.1	2.6	3.0	2.5	1.7	9.0 ppm (rolling 8- hour average)
NO ₂ (ppm)	0.04 5	0.04 0	0.06 4	0.05 3	0.04 4	0.03 7	0.03 8	0.04 8	0.03 6	0.03 7	0.12 ppm (1-hour average)
ΡΜ ₁₀ (μg/m ³)	53.6	85.8	71.5	55.6	44.4	43.2	119. 9	126. 4	194. 3	46.2	50 µg/m3 (24-hour average)

Table 3 Background air quality monitoring results

Source: DEC, (2004), "AAQ NEPM Annual Compliance Report 2003". NB ppm = parts per million

 $\mu g/m^3 = micrograms \ per \ cubic \ metre$

The data indicates that Richmond achieved compliance with the Ambient Air Quality National Environment Protection Measure (AAQ NEPM) goals for CO and NO₂. Levels of these pollutants are consistently below AAQ NEPM standards. Compliance with AAQ NEPM goals for fine particles (PM₁₀) exceeded recommended levels in 1995 and 1998 and most recently between 2001 and 2003. The increase in levels during this these times is not known but may be a result of bushfire activity in the area. The DEC (2004) advised 'extraordinary natural events such as bushfires and dust storms, influenced by the severe drought experienced throughout NSW during 2003, have contributed to the observed ...particle pollution events'.

5.3.2 Potential Impacts

5.3.2.1 Construction

The principal air pollutant likely to be associated with construction is dust or PM_{10} generated during the construction works. During the construction of the rising main, the principal sources of air pollution would be pipe trenching, vehicles travelling along the route and dust from stockpiles of soil.

The nature of the impact would be short-term and temporary in nature associated mainly with soil disturbance and movement during earthworks, pipe laying and reinstatement. Potential air quality impacts generated by construction activities can be controlled through the implementation of appropriate air quality control measures and dust suppression strategies. The assessment criteria for particulate matter, is defined within the DECC's '*Approved Methods and Guidance: For the Modelling and Assessment of Air Pollutants in New South Wales*' 2001 and is detailed in **Table 4** and

Table 5 below.

Table 4 Deposited dust assessment criteria

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level	
Deposited Dust	Annual	2 g/m ² /month	4 g/m ² /month	

Source: DEC, 2001

NB: $g/m^2 = grams \ per \ metre \ square \ per \ month$

Table 5 Airborne particulates assessment criteria

Pollutant	Averaging Period	Concentration
TSP	Annual	90 μg/m ³
PM ₁₀	24 hr	50 μg/m ³
PM ₁₀	Annual	30 μg/m ³

Source: DEC, 2001

The close proximity (ranging from approximately 20m to 50m) of the works to residences means that there is potential for impacts from dust. However, by limiting the width of the trench and backfilling at regular intervals, the work areas can be restabilised and rehabilitated within a short timeframe. By ensuring work area lengths are minimised as far as is practical for construction of the pump station and rising main, the ability to control and minimise impacts will be greatly enhanced.

5.3.2.2 Operational Phase

Operational odour sources would include waster water from the Fernadell, Bona Vista, Blighton and Cleary catchments. To mitigate odours due to retention times at the pump station, odour control will be required to be addressed as per the Sewage Pumping Station Code of Australia WSA 04-2005:2.1 Section 2.9

"The designer shall provide evidence that odour generation and control has been considered. This will include calculations that demonstrate odour generating potential and how any odours generated will be treated".

Factors that will influence the odour controlling techniques will include but not limited to:

- Local climatic conditions.
- Proximity to residential dwellings.
- Staging operations of WWPS PT1 and RM PT1.

Detention times and odour control must be considered for the proposed WWPS and RM 'PT1'. The gradual phasing of development and the 6 km (approximate) length of the rising main will result in varying detention times and therefore require the implementation of septicity and odour control measures.

Maunsell has investigated options to use reduced diameter rising mains and dual rising mains in an attempt to reduce the detention times. All of the alternatives require chemical dosing measures to prevent septicity and odour. Therefore, it is concluded that an optimum solution will involve installing an odour control facility at WWPS 'PT1' and adopting a rising main of 450 mm diameter.

The most frequent activity associated with operation of the sewer would be surveillance activities, involving minimal dust and air quality impacts. Excavations may be required along the route for corrective and preventative maintenance. However, due to other protective measures and systems in place such excavations are rarely required. The potential for dust impacts during routine maintenance work would be minimal and would be controlled in the same manner as the potential construction impacts.

5.3.3 Mitigation Measures

An Air Quality and Dust Management Sub-plan will be prepared as part of the CEMP. The following measures would be implemented to mitigate potential impacts on local air quality during construction of the works.

- Access for vehicles would be limited to stabilised areas as far as practicable. This is to reduce sediment tracking onto local roads and potential dust generation.
- Provision of 'all weather' access points to construction haul routes, compounds or pipe lay-down areas.
- Establishment and enforcement of appropriate onsite vehicle speed limits.
- Vehicle loads are to be covered.
- Exposed stockpiles and unsealed construction areas would be sprayed with water from watering carts as appropriate to minimise dust.
- Vehicles and machinery would be regularly serviced and maintained to optimum working conditions to minimise potential exhaust emissions.
- During weather events where wind speeds exceed 10m/s and where dust generation can not be effectively minimised, dust generating works are to cease (until adequate controls can be implemented or) until such weather conditions abate.
- Any complaints relating to air emissions from construction activities would be promptly investigated and where required, additional controls implemented.
- Clearing is to be limited to the minimum required for safe construction to limit exposed areas and vegetation removal.
- Exposed areas will be stabilised as soon as practicable with seeding and planting (where area is not to be paved).
- Confinement of vehicles and activities to designated work areas to prevent any inadvertent encroachment upon areas that are not to be cleared.
- Drilling is to be undertaken with access to water and a shroud or filter where dust generation is likely to be excessive.
- All emission controls used on vehicles and construction equipment would comply with relevant DECC standards as provided under section 124 of the *Protection of Environment Operations Act* 1997.
- To avoid septicity and odour issues an odour control facility at WWPS 'PT1' will be installed.

5.4 Flora and Fauna

5.4.1 Existing Environment

The vegetation communities and the location of threatened flora and fauna are shown in **Figure 10**. This figure is based on site investigations and NPWS (2002) vegetation mapping.

The flora and fauna report which includes survey methods and species inventories is included as **Appendix D.**

Figure 10 Approximate location of rising main and pump station with respect to existing vegetation in flora and fauna flora and fauna study area



5.4.1.1 Flora and vegetation communities

Much of the route of the proposed rising main is within existing road reserves and cleared land. The section of the proposed rising main that has potential to cause direct impacts to native vegetation and fauna habitat is shown in **Figure 10** and assessed below.

The site of the proposed pump station and access road is adjacent to a remnant of Shale Gravel Transition Forest in the Sydney Basin Bioregion (SGTF), an Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1995* (TSC Act). This community is not listed under the *Environmental Conservation and Biodiversity Conservation Act 1999* (EPBC Act). The area that would be occupied by the pump station and access road has previously been cleared and is dominated by exotic vegetation including Kikuyu Grass *Pennisteum clandestinum* and *Bidens pilosa* though some native groundcover species including *Juncus usitatus, Oplismenus aemulus* and *Eriochloa pseudoacrotricha* and a few isolated trees remain (**Figure 11**)

Scattered individuals of *Eucalyptus* spp. and *Melaleuca decora* also occur here. The adjacent wooded area to the north and east contains relatively intact SGTF. There is evidence of previous partial



clearing and regrowth of this woodland. Approximately ten individuals of *A. pubescens* occur in this remnant. *A. pubescens* has a suckering habit and thus this count is based on the number of distinct clumps (1-4 m in width with 1-20+ stems) rather than the number of stems. The precise number of genetic individuals is hence unknown. This area would not be directly affected by the proposed works.



Figure 11 Vegetation cover at the site of the proposed pump station

The unformed section of Bootles Lane between the existing sealed section of Bootles Lane and Cattai Road contains SGTF. This section of the route consists of a previously cleared and disturbed middle strip (dirt track in northern half),of variable width, (approximately four to seven metres) with strips of vegetation on each side. Each strip of vegetation is of variable width, (approximately five to eight metres). The vegetation here varies in condition and is a mix of native and exotic species though most of its extent remains recognisable as SGTF. The highly disturbed middle strip contains areas of bare soil, patches of exotic grasses and forbs and piles of logs and rubbish and would not be considered to be SGTF in its current form. The canopy is dominated by Red Ironbark *Eucalyptus fibrosa* and Grey Box *Eucalyptus molucanna*. Two clumps of Downy Wattle *Acacia pubescens*, listed as Vulnerable under both the TSC Act and the EPBC Act, are present on the south-western side of the middle strip, in the northern half of this section (See **Figure 10**).

The road reserve on the north-western side of Cattai Road, from Buckingham Street for approximately 70m north-east contains disturbed SGTF. This section of SGTF would not be affected by the proposed works as the rising main would be constructed on the south-eastern side of Cattai Rd.

The road reserve on the south-eastern side of Cattai Road is dominated by exotic grasses including *Eragrostis curvula* and is largely free of native vegetation with the exception of a discontinuous canopy of *Eucalyptus* species.

Several specimens (8 stems) of *Acacia pubescens* occur in a small patch of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43.

The section of the rising main route between Cattai Road and Old Pitt Town Road traverses a partially cleared parcel of land. This area contains scattered trees but has minimal understorey vegetation. No shrub species are apparent here though small eucalypts (less than 1m) are scattered throughout the groundcover layer. The lack of shrubs and larger eucalypt regrowth is likely as a result of regular mowing or grazing. The ground layer here consists primarily of a mix of native and exotic grasses and forbs. No threatened plant species were recorded here and given the previous and ongoing disturbance to this vegetation, none are considered likely to occur. Despite being highly disturbed, this vegetation is considered to conform to the description of SGTF.

After crossing Old Pitt Town Road, the route continues along the southern side of the road for approximately 70 metres to the west, crossing Hortons Creek, a tributary of Pitt Town Lagoon. The route avoids the nearby patch of SGTF which contains approximately 25-30 individuals of *Dillwynia tenuifolia* which is listed as a Vulnerable species under both the TSC and EPBC acts.

Where the rising main crosses Hortons Creek it passes through a small patch of degraded riparian vegetation consisting primarily exotic plant species including kikuyu grass *Pennisetum clandestinum*, blackberry *Rubus fruticosus species complex*, morning glory *Ipomoea indica*, with cumbungi *Typha orientalis* the only abundant native species. Noxious aquatic weed species (e.g. Alligator Weed *Alternanthera philoxeroides*) are known to occur in the region. No noxious aquatic weeds were found at the location of the creek crossing and hence the likelihood that the proposed works would contribute to the spread of these species is considered to be low. Other creek crossings are within cleared and disturbed environments and would be under-bored. With the implementation of the mitigation measures described herein significant impacts on riparian vegetation in these areas is unlikely.

Figure 12 Vegetation within the unformed section of Bootles lane (facing south)



Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any additional threatened plant species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there are a number threatened species recorded in the vicinity of the site. The likelihood of occurrence of these species based on previous records and habitat attributes is summarised in **Appendix D**. Those species which were considered to have a moderate to high likelihood of occurring on the site on the basis of distribution and habitat requirements are shown in **Table 6** below.

5.4.2 Fauna

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened fauna species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there were a number threatened species recorded in the vicinity of the site. The likelihood of occurrence in the flora and fauna study area of these species based on previous records and habitat attributes is summarised in **Appendix D**. The species which are considered to have a moderate to high likelihood of utilising the habitats of the flora and fauna study area are shown in **Table 6**.

One threatened fauna species, the Cumberland Land Snail *Meridolum corneovirens* was recorded in the flora and fauna study area during the visits. This species was recorded in the patch of SGTF within the flora and fauna study area south of Old Pitt Town Road. This species was not recorded elsewhere in the flora and fauna study area during targeted searches. The fauna species recorded during the site visit are shown **Appendix D**.

Habitat for a variety of fauna species exists within the remnant SGTF areas occurring within the study site and is described below.

Eucalypts, (*Eucalyptus* spp.), Wattles (*Acacia* spp.) and Paperbarks (*Melaleuca* spp.) provide a food source in the form of leaves, sap, nectar, pollen and seed for a number of bird, mammal and insect species. Threatened species with a moderate to high likelihood of using this resource include *Pteropus poliocephalus* (Grey-headed Flying-fox), *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Melithreptus gularis* (Black-chinned Honeyeater), *Phascolarctos cinereus* (Koala) and *Petaurus*

australis (Yellow-bellied Glider). The migratory nectivores *Lathamus discolor* (Swift Parrot) and *Xanthomyza phrygia* (Regent Honeyeater) may use this resource sporadically or on a seasonal basis.

Foraging habitat for insectivorous bird species exists in the canopy, understorey and groundcover levels of the SGTF. Threatened species that may use this resource include *Climacteris picumnus* (Brown Treecreeper) and *Pyrrholaemus sagittatus* (Speckled Warbler).

Large and medium-sized tree hollows were observed in the flora and fauna study area to the north of the location of the pump station (see photos in **Appendix D**). Small hollows and fissures may also exist within the dead standing trees of the site. These hollows provide potential den, nest and roost sites for a number of bird, mammal and reptile species.

Threatened species which may use these hollows include *Tyto novaehollandiae* (Masked Owl), *Ninox strenua* (Powerful Owl), *Ninox connivens* (Barking Owl), *Petaurus australis* (Yellow-bellied Glider), *Callocephalon fimbriatum* (Gang-gang Cockatoo) and hollow-roosting bats including *Falsistrellus tasmaniensis* Eastern False Pipistrelle, *Mormopterus norfolkensis* (Eastern Freetail-bat), *Scoteanax rueppellii* (Greater Broad-nosed Bat).

In addition to the bat species listed above, several other threatened, non hollow-roosting species may forage in the air spaces within and around the vegetation including *Chalinolobus dwyeri* (Large-eared Pied Bat) and *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

Threatened predatory birds including the owl species listed above and *Lophoictinia isura* (Square-tailed Kite) may hunt in the woodland of the flora and fauna study area and nearby areas.

The leaf-litter, fallen logs and grass clumps of the flora and fauna study area form potential habitat for the endangered Cumberland Land Snail *Meridolum corneovirens*.

The EPBC act search also showed that 14 migratory terrestrial, wetland and marine species protected under the act are likely to occur in the area. Of these the following species have moderate to high potential to occur on the site with respect to habitat attributes; *Hirundapus caudacutus* (White-throated Needletail), *Merops ornatus* (Rainbow Bee-eater), *Monarcha melanopsis* (Black-faced Monarch), *Myiagra cyanoleuca* (Satin Flycatcher), *Rhipidura rufifrons* (Rufous Fantail), *Xanthomyza phrygia* (Regent Honeyeater), *Ardea ibis* (Cattle Egret)and *Apus pacificus* (Fork-tailed Swift). The waterways of the flora and fauna study area and locality of the proposed rising main are presently subject to impacts associated with increased nutrients, sedimentation, weed invasion and the presence of exotic fish species. Only common native fish and frog species that are capable of persisting in highly disturbed waterways are considered likely to persist here. Although Hortons Creek contains some potential habitat for the Green and Golden Bell Frog *Litoria aurea*, this species is not considered likely to occur here due to the poor condition of the waterway and the fact that the species has not been recorded in the Hawkesbury LGA since the late 1970's.

The Black-faced Monarch, Satin Flycatcher and Rufous Fantail may breed in the area.

Species Name	Status	Likelihood of Occurrence	Database / Act
Callocephalon fimbriatum Gang-gang Cockatoo	Vulnerable	Moderate to High	TSC
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat, Large Pied Bat	Vulnerable	Moderate to High	EPBC, TSC
<i>Climacteris picumnus</i> Brown Treecreeper	Vulnerable	High to Moderate	TSC

Table 6 Threatened flora and fauna species and the likelihood of occurrence

Species Name	Status	Likelihood of Occurrence	Database / Act
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	Vulnerable	High to Moderate	TSC
<i>Lathamus discolor</i> Swift Parrot	Endangered	Moderate	EPBC, TSC
<i>Lophoictinia isura</i> Square-tailed Kite	Vulnerable	Moderate to High	TSC
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Moderate to High	TSC
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	Known in one section, Moderate to High in remainder.	TSC
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	Moderate to High	TSC
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	Moderate to High	TSC
<i>Ninox connivens</i> Barking Owl	Vulnerable	Moderate to High	TSC
<i>Ninox strenua</i> Powerful Owl	Vulnerable	Moderate to High	TSC
<i>Petaurus australis</i> Yellow-bellied Glider	Vulnerable	Moderate to High	TSC
Phascolarctos cinereus Koala	Vulnerable	Moderate to High	TSC
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Moderate to High	EPBC, TSC
<i>Pyrrholaemus sagittatus</i> Speckled Warbler	Vulnerable	Moderate to High	TSC
Scoteanax rueppellii Greater Broad-nosed Bat	Vulnerable	High to Moderate	TSC
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	Moderate to High	TSC
<i>Xanthomyza phrygia</i> Regent Honeyeater	Endangered	Moderate	EPBC, TSC
Plants			
Acacia pubescens	Vulnerable	Recorded on site	EPBC, TSC
Downy Wattle Dillwynia tenuifolia	Vulnerable	Recorded on site	EPBC TSC
Grevillea juniperina subsp. juniperina Juniper-leaved Grevillea	Vulnerable	Moderate	TSC
Pimelea spicata	Endangered	Moderate	EPBC, TSC
Pultenaea parviflora	Vulnerable (EPBC)	Moderate	EPBC, TSC
Species Name	Status	Likelihood of Occurrence	Database / Act
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	Endangered (TSC)		
<i>Persoonia nutans</i> Nodding Geebung	Endangered	Moderate	EPBC, TSC
Reference: Habitat requirements as	s per DECC threat	ened species profiles	

5.4.3 Potential Impacts

5.4.3.1 Construction

5.4.3.1.1.1 Flora

The construction of the proposed pump station and access road would require the removal of a small amount (approx 0.01 ha) of highly disturbed SGTF within the adjacent road corridor for the construction of the access road. The removal of approximately four live immature trees (*Eucalyptus* and *Melaleuca* spp.) and one dead standing tree would be required. Some damage to the root systems of remaining trees may also be caused by construction works. Most of the vegetation affected is not considered SGTF as it contains very few understorey or groundcover species which are listed in the threatened ecological community profile and Scientific Committee final determination. The ground layer in the location of the pump station is dominated by exotic species and the few native species are commonly found in a variety of vegetation communities, including highly disturbed environments.

The dominance of exotic species in this community is such that it would be unlikely to regenerate and would require a reconstructive approach to be returned to near natural structure. This area has the potential however to be rehabilitated and integrated into the existing remnant through weed removal and revegetation. The construction of the pump station thus limits the potential for the recovery of this SGTF remnant. The revegetation of the remaining areas of exotic vegetation and regeneration works in the retained SGTF adjacent to the pump station site would contribute to the offset of this impact.

The earthworks required for the installation of the rising main would require the removal and/or disturbance of approximately 0.35 ha of disturbed SGTF on the eastern edge of the unformed section of Bootles Lane and between Cattai Road and Old Pitt Town Road.

There is some potential for adjacent areas of SGTF and isolated trees to be impacted upon in other parts of the rising main route within the flora and fauna study area through damage to tree roots caused during the digging of the trench.

Construction of the pump station, access road and rising main has the potential to exacerbate the weed situation of the flora and fauna study area by introducing additional weed species, spreading weeds and causing soil disturbance. There is also the potential for the introduction of plant pathogens such as Phytophthora Root Rot fungus *Phytophthora cinnamomi*. If the mitigation measures described below are implemented however, the overall condition of the vegetation of the flora and fauna study area could be improved.

Several specimens (8 stems) of *Acacia pubescens* occur in a small isolated patch (approx 0.005 ha) of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43 may be damaged or removed during construction, though the precise distance between these and the route of the rising main is not known at present as no survey pegs are evident in this section of the route and the boundary between the road corridor and adjacent property is indistinct. It has been assumed in this assessment that these individuals would be damaged though construction methodology used here would minimise this potential impact.

Accidental damage to *Dillwynia tenuifolia* is possible but the likelihood of this occurring would be low given the proposed rising main route, construction methodology and mitigation measures. The

alignment of the rising main has been re-designed to avoid *Dillwynia tenuifolia* individuals and potential habitat. Significant impacts on this species are not considered likely.

Some indirect impact on the Freshwater Wetlands EEC as a result of the installation of the rising main at Hortons Creek is possible due to disturbance of the creek bed. Given the small extent and poor condition of this vegetation and the nature of the works, this impact is not likely to be significant.

Tests of significance (7-part tests) and EPBC Act significance assessments have been conducted for *Acacia pubescens, Dillwynia tenuifolia* and SGTF and have concluded that no significant negative impact on these is likely to occur as a result of the proposal (See **Appendix D**).

EPBC Act threatened species assessments are also included in **Appendix D** for the species considered likely to be affected and have also concluded that no significant impact on these species is likely to occur.

Several other threatened species have a moderate potential to occur in the flora and fauna study area including *Grevillea juniperina subsp. juniperina, Pimelea spicata* and *Pultenaea parviflora*. These species may be present but have gone undetected during investigation due to a cryptic habit or occurrence in the form of a soil-stored seedbank. None of these species are likely however to exist in the disturbed vegetation of the earthworks areas and hence significant impacts on these species are considered unlikely.

5.4.3.1.2 Fauna

The construction activities proposed would result in the permanent removal of a very small amount (approx. 0.05 Ha) of degraded foraging habitat in the location of the pump station for some of the mobile threatened species described above.

The removal of disturbed SGTF vegetation for the rising main, as described above, would result in the loss of some potential foraging habitat. The removal of hollow-bearing trees would have the greatest influence on the severity of impacts on a number of threatened hollow-dependent species. No removal of known hollow-bearing trees would be necessary for construction and the impact on hollow-dependent fauna would is not likely to be significant. Most of the trees affected are not of sufficient size to produce hollows and many are ironbarks, a group of eucalypts that do not readily form hollows. Some damage to the root systems of potential hollow-bearing trees may occur during earthworks.

Most of the threatened and migratory fauna species likely to occur are highly mobile and are unlikely to be killed or injured during earthworks or use the affected areas exclusively. The Cumberland Land Snail is at risk, if it occurs here, as it is small and slow-moving and hence would be unable to flee and may not be detected during earthworks. This species was not detected on the site of the proposed pump station during targeted searches in the earthworks area or in surrounding relatively intact SGTF. The habitat in the earthworks areas is considered sub-optimal due to a lack of leaf-litter and the paucity of fallen logs.

The Cumberland land Snail was however detected in the patch of SGTF between Old Pitt Town Road and Hortons Creek. The route of the rising main has been re-designed to avoid this habitat. A test of significance (7-part test) has been conducted for this species and has concluded that no significant negative impact on this species is likely to occur as a result of the proposal (See **Appendix D**).

The earthworks area would only comprise a small proportion of the foraging range of individuals of threatened bird, bat and arboreal mammal species and would not result in the removal of likely roosting or nesting habitat. Members of these groups are therefore unlikely to be significantly affected by the proposal.

Significant impacts on native fish species are considered unlikely to occur as the pumping station and rising main would not create any disruption to fish passage and would have minimal effect on the hydrology of any waterway. No threatened fish species been recorded in the waterways of the flora

and fauna study area. No further consideration has therefore been given to the potential occurrence or impact on fish species.

5.4.3.2 Operation

No significant impacts on flora and fauna are considered likely during operation of the pump station and rising main due to the design of the sewerage infrastructure to cope with emergency situations and the proposed operational mitigation measures.

5.4.4 Mitigation Measures

5.4.4.1 Flora

The potential impacts on threatened flora species and ecological communities would be mitigated in a number of ways:

- The minimum practicable clearing of SGTF and trees would be conducted for construction purposes and threatened species would be avoided where feasible. Trenches in the vicinity of retained trees are to be hand-excavated or bored and are to proceed only with approval of the site arborist. Hand excavation and boring would also be used to avoid the removal of threatened plants (i.e Downy Wattle *Acacia pubescens*). Any pruning of retained trees would be undertaken by the site arborist.
- The choice of equipment used in the installation of pump station and rising main would ensure that the minimum amount of disturbance would be required for access and earthworks in areas containing native vegetation.
- Earth-working equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from work areas to minimise the likelihood of the spread of weed seeds and plant pathogens.
- Suitable control measures would be implemented to prevent erosion and sediment deposition as per the CEMP.
- Where practicable, minor alterations to the path of the rising main would be made to minimise impacts on SGTF, threatened plants and retained trees.
- Temporary fencing would be placed between areas containing threatened plant species and SGTF to be retained to exclude earthworks. Fencing would be placed outside the drip-line of trees where possible.
- Regeneration and revegetation of disturbed areas on and adjacent to the construction areas would be conducted using local provenance plant species indigenous to the SGTF EEC. This would include the entire area (0.5 Ha) of exotic vegetation and poor condition SGTF adjacent to the pump station (see **Figure 10**) and the entire unformed section of Bootles Lane. Revegetation of existing road corridors and areas zoned as future roads would be restricted to the installation of a weed-free mulch and the planting of native grasses and other native groundcover vegetation to prevent erosion. Where the sewer main causes damage to public parks, turf should be replaced after backfilling is completed.
- Bushland regeneration would be conducted by a suitably qualified and experienced contractor after the end of construction works in all areas of retained vegetation and revegetated areas. Weeds, especially Kikuyu Grass and noxious weeds, must be adequately controlled prior to revegetation and maintained at a low (less than 90% of current) density during this period.
- The distance between open trenches and retained trees would be maximised within the constraints imposed by existing and planned infrastructure such as roads and other services.
- All trees requiring removal for the construction of the pump station and access road would be cut into manageable lengths for use in habitat augmentation within the adjacent SGTF remnant.
- All other native vegetation cleared would be mulched and stockpiled on site for later use in soil stabilisation and vegetation rehabilitation. Mulch would be stockpiled in disturbed vegetation adjacent to the pump station and/or rising main so as to minimise disturbance to native vegetation and the spread of weeds. Advice would be sought from an ecologist to determine suitable locations for stockpiles.

- An ecologist or suitably experienced and licensed bushland regenerator would be present for all tree-felling to collect seeds for use in revegetation.
- Excavated soil would be separated into topsoil and subsoil components and replaced in its original order during backfilling to facilitate regeneration and revegetation activities.
- Retained trees would be monitored during vegetation rehabilitation and any signs of poor health reported to HCC and the site arborist in order to determine an appropriate course of action.
- All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

5.4.4.2 Fauna

The mitigation measure described in **Section 6.1** above for the protection of native flora would also assist in the protection of habitat for fauna species.

Additional mitigation measures would include:

- An ecologist would be present during the removal of any large woody debris in order to relocate any native fauna using this habitat to retained strands of SGTF. If any additional threatened species are discovered works would cease immediately. Advice would be sought from the Hawkesbury City Council ecologist and appropriate measures would be implemented to protect or relocate individuals of these species prior to the resumption of works. The discovery would also be reported to the DECC.
- Fallen logs would be relocated from earthworks areas to adjacent patches of SGTF under the supervision of an ecologist.
- All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

5.5 Traffic and Accessibility

5.5.1 Existing Environment

Bootles Lane and Pitt Town Road run parallel to the majority of the works. They link Pitt Town to Mcgraths Hill and major centres and provide an important commuter corridor. These roads are single carriageway, running predominately north-south.

The speed limit varies from 60 km and is 50 km/h within townships.

Access for the proposed works will be through sealed local roads, located approximately 2 km north of the town centre. These are Redfern Place, Mitchell Road and Pitt Town Road. The site investigation noted properties along the access roads, with low traffic and pedestrian movements.

5.5.2 Potential Impacts

5.5.2.1 Construction

The majority of trips to and from the site would comprise of truck movements delivering construction materials and removing waste and private vehicle trips made by construction workers. Pitt Town Road is the direct route to the site and is anticipated to be utilised for construction vehicles. Consequently, there may be some minor delays during the construction phase for motorists using the roads, as a result of heavy vehicles and machinery. There could also be temporary disruptions to access on private roads that intersect the works which might affect local residents. Overall, the Proposal is expected to have minimal effect on local traffic and access during construction and operation.

5.5.2.2 Operation

A vehicle will visit the pump station twice per week for maintenance plus a further monthly visit to renew chemicals. The pumping station will generate no impacts on traffic or access during operation of the proposed works.

5.5.3 Mitigation Measures

Adequate provision for emergency access, pedestrian/cyclists routes and crossings, temporary property access arrangements will be provided.

A Site Safety Plan and liaison with local emergency services is required. Emergency access to the Pitt Town site will be provided during construction and operation of the proposal.

Construction plant, machinery and staff parking will be provided within the works corridor, thereby reducing impacts on local properties. The appropriate traffic control measures such as using stop/go signage if required will be implemented.

Immediately adjacent residents will be consulted during the development of this plan to ensure they are aware of the potential traffic impacts. A dedicated site/project officer will be provided as contact for any complaints.

5.6 Noise and Vibration

5.6.1 Scope of Noise Assessment

Bassett Acoustics undertook a construction noise and vibration assessment report of the likely impact of the construction phase of the Pitt town pumping station and rising main (**Appendix E**).

The scope of the construction noise and vibration assessment is as follows:

- Establishment of construction noise and vibration objectives in accordance with current legislation and guidance;
- Identification of noise sensitive receivers likely to be affected by construction noise and vibration;
- Calculation of noise and vibration levels likely to be associated with the northern earthworks at noise sensitive receivers and evaluation of the resulting impacts; and
- Consideration of the impacts that may result from the proposed works and, if necessary, mitigation measures to reduce adverse impacts.

In addition the potential impact on residential receivers of the operational noise associated with the generator at the pumping station has been assessed.

5.6.1.1 Construction Equipment

The proposed construction will employ trenching, loading and unloading of trucks and backfilling. It is expected that the following key equipment will be used:

- Excavator
- Mobile Crane
- Dump Truck
- Trenching Machine
- Directional Drill
- Compactor

5.6.2 Existing Noise Environment

The most sensitive residential locations near the pumping station, the rising main are shown in.

Figure 13. Three groups of receivers have been identified for the placement of noise loggers to record background noise.



Figure 13 Receiver locations

5.6.3 Noise and Vibration Criteria

The NSW Department of Environment and Climate Change's (DECC) Environmental Noise Control Manual (ENCM) has been largely superseded by the NSW Industrial Noise Policy (INP) and the Noise Guidelines for Local Council (NGLC). Construction noise criteria were previously specified in the ENCM and have not been included in either of the aforementioned publications. The DECC have advised that they are currently developing new draft guidelines for managing construction noise which will adopt a "best practice" type approach that attempts to reduce construction noise to a level that is limited by what is feasible and reasonable.

The objective noise levels for construction noise recommended by Chapter 171 of the ENCM are presented in **Table 7**.



Table 7 Background noise levels

Construction Period	L _{Aeq} Daytime Objective Noise Levels dB(A)
< 4 weeks	L _{A90} + 20
4-26 weeks	L _{A90} + 10
> 26 weeks	L _{A90} + 5

"Normal working hours" defined in the DECC's Environment Noise Control Manual are defined as:

- 7:00 am 6:00 pm Monday to Friday
- 7:00 am 1:00 pm Saturday if inaudible on residential premises, otherwise 8:00 am to 1:00 pm. No construction work to take place on Sundays or Public Holidays.

It is assumed there will be no night time construction works.

5.6.3.1 Application to this project

The works will continue for more than 26 weeks. However as the construction is expected to progress at approximately 60m per day no one residence will be exposed to noise associated with the construction for more than 5 days. Therefore the applicable construction noise objective will be $L_{A90} + 20 \text{ dB}(A)$. These are summarised in **Table 8** for each of the three sensitive groups of receivers.

Note that the noise levels measured at 6 Buckridge Dr are assumed to be representative of the residential receivers along Pitt Town Rd.

Table 8 Construction noise objectives

Site Location	L _{A10} Daytime Noise Objective (L _{A90} +20 dB(A))
Group 1	61
Group 2	56
Group 3	56

A summary of the environmental noise criteria is given in **Table 9**. Since the proposed plant will be located near Bootles Lane the operational criteria has been determined using the RBL's measured at this location (which corresponds to Group 3).

Table 9	Summary	of	environmental	noise	criteria
			•		

Period	RBL (L _{A90})	Intrusive Criterion = RBL + 5	Amenity Criteria (dB(A))	Final Environmental Criteria	
	Bootles Ln				
Day	35	40	55	40	
Evening	34	39	45	39	
Night	30	35	40	35	

5.6.4 Construction Noise and Vibration Assessment

Table 10 shows the predicted levels of noise during construction. Table 11 shows the noise levels to be met.

Distance (m)	Predicted L _{A10} Noise Levels (dBA)				
Distance (iii)	Stage 1	Stage 2	Stage 3	Stage 4	
10	60	56	61	58	
20	59	55	60	57	
50	54	50	55	52	
100	49	45	50	47	
200	43	39	44	42	

Table 10 Predicted construction noise levels at various distances from the construction

Table 11 Objective noise levels

Site	Objective Noise Level L _{A10} Day, dB(A)
Group 1	61
Group 2	56
Group 3	55

The construction noise objectives will be exceeded at the properties closest to the construction for the residential Groups 2 and 3, assuming minimum distances of 10m and 20m respectively. However this is a worst case scenario and it is expected that the majority of houses within this location will be further from the construction.

5.6.5 Construction Vibration Assessment

Table 12 below shows the typical worst case vibration levels expected due to the use of construction equipment. These levels will only occur for very short periods and should not exceed 2 days duration for any one property during the construction period.

Activity	Approximate Distances (m)	Typical Vibration
Compactor (Handhold)	5 m	20 mm/s
	10 m	<5 mm/s
Executor	5 m	1.0 - 2.0 mm/s
Excavator	>20 m	Usually < 0.2 mm/s
Truck traffic	Puilding factings located 10 m from a readiusy	0.01 mm/s -
(over normal road surfaces)	Building foolings located to mittom a roadway	0.2 mm/s
Truck traffic	Building footings located 10-20 m from a	0.1 mm/s -
(over irregular surfaces)	faces) roadway	

Table 12 Typical vibration levels caused by construction equipment

It is considered unlikely that the vibration levels will pose a risk to structurally sound buildings or cause adverse comment at the residential locations along the construction route.

5.6.6 Pumping Station Operational Noise Assessment

The pumping station located at Pitt town will consist of one emergency 350 kVA generator with a modular acoustic enclosure (typical sound power level 93 dB(A)) and two 55kW pumps which will be mounted inside a 9m deep concrete pit. It is understood that the pumping station will have a mains electricity supply, however an emergency generator will be utilised during power outages. The pumps will run during the day, evening and night time periods. Effects of site topography, wind and temperature changes have not been taken into account. The pumping station site is bounded by Bootles Lane to the south.

Table 13 shows the predicted noise due to the emergency generator and pumps at the nearest residence. It is assumed that the nearest residence is approximately 80 m away. It can be seen that the environmental criteria are exceeded during the day, evening and night time periods, however as the generator will only be operational during an emergency power outage or during testing (which will occur during the day) these noise levels are considered acceptable. During normal operation the pumping station noise will not exceed the environmental criteria as noise from the pumps will be negligible.

Period	Environmental Criteria	Pumping Station Noise		
		L _{Aeq} level dB(A)	Exceedance	
Day	40	45	5	
Evening	39	45	6	
Night	35	45	10	

Table 13	Predicated noise levels at residences on Bootles I are during an emergency power outage
Table 15	Treated house levels at residences on bootles care during an emergency power outage

5.6.7 Recommendations

The noise level emissions from site plant and the potential annoyance to sensitive receptors will depend on the selection of equipment, the type of operation, the activity duration and the time of day it is conducted. The contractor should demonstrate best practicable means and include noise mitigation measures in the construction management plan.

Generic measures to minimise the construction noise impact are detailed below, and are given to illustrate the range of techniques available:

- Construction activities to be limited to between 7 am and 6 pm Monday to Friday and 8 am to 1 pm Saturday;
- Possible restrictions to construction hours (beyond the above hours) where noise impacts are significant;
- The contractor would be required to select and operate plant and equipment with appropriate mufflers and noise controls, and where practical, to adopt work practices which would minimise noise impacts. These measures would be implemented as part of the construction stage EMP;
- All plant items should be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
- All pneumatic tools should be fitted with silencers or mufflers;
- Minimise requirements for vehicle movements outside normal daytime working hours;
- An information programme would be developed to inform the local residents of the construction
 programme and time periods when noise levels could exceed the relevant goals. This information
 program may include letter box drops, phone calls, a website and consultation with community
 groups;
- Provide induction and training to staff and sub-contractors outlining their responsibilities with regard to noise, and;

• Noise monitoring at sensitive locations as agreed with DECC for any excessive noise or noise complaints being assessed with appropriate action taken;

The noise and vibration mitigation measures listed above will be implemented where reasonable and feasible.

5.6.7.1 Special Construction Noise Mitigation Measures for Residential Locations Likely to be Adversely Affected

The contractor will, where reasonable and feasible, apply best practice noise mitigation measures including:

- Select site access points and roads away from residences;
- Apply time restrictions on noisy tonal or repetitive activities;
- Provide respite periods for any activities that result in impulsive or tonal noise generation;
- Switch off equipment during break times;
- Combine noisy activities to reduce their impact and duration;
- Maximising the offset distance between noisy plant items and nearby sensitive receivers;
- Avoiding the coincidence of noisy plant items and nearby noise sensitive receivers;
- Orientating equipment away from noise sensitive areas;
- Carrying out loading and unloading away from noise sensitive areas;
- Use temporary barriers to screen noisy activities at sensitive receptors;
- Where variable pitch reversing alarms are fitted to plant, they will be required to be set on the lowest safe level, and where practicable, endeavour to provide drive-through facilities to minimise utilisation of reverse warning devices. The use of broad-band reversing alarms will be considered.

In order to minimise noise impacts during the construction works, construction contactors will take all reasonable and feasible measures to mitigate noise effects. Pro-active management of the works, in particular adhering to the prescribed working hours and mitigating noise impacts, and maintaining good relations with the surrounding community should ensure that the impacts are minimised.

5.6.7.2 Construction Vibration with Mitigation Measures

Prior notification to residences and investigative monitoring would be advised to prevent "adverse comment". Although vibration levels of 5 mm/s or below are unlikely to pose a risk to structurally sound properties, vibration levels above 1 mm/s can cause anxiety to residents and cause concern for their properties. Good public relations is the most practicable and effective approach to minimise complaints.

5.6.8 Conclusions

The likely impact of noise and vibration associated with the construction of a pumping station and rising main on sensitive residential receivers has been assessed. It is expected that the construction noise objectives will be exceeded and suitable recommendations have been given to cover all reasonable and feasible mitigation options.

In addition the potential effect of the operational noise associated with a pumping station located in Pitt Town has been examined. It is likely that the environmental criteria will not be exceeded during normal operation of the pumping station.

5.7 Indigenous Heritage

The following sections contain a summary of potential aboriginal archaeological heritage impacts consisting of extracts from the *Preliminary Aboriginal Archaeological Assessment* produced by AHMS **(Appendix F)**.

5.7.1 Existing Environment

Regional and local studies have permitted a comprehensive model of archaeological site distribution to be developed for the Cumberland Plains. The model suggests that archaeological sites are focussed upon the higher order creeks (such as the Hawkesbury River and South Creek), situated on the surrounding river terraces, lower slopes and to a lesser extent surrounding elevated areas. Confluences of major creeks are also significant for archaeological distribution. In these areas, the soil profile is often preserved and can be in excess of 70 cm, permitting good stratigraphic and temporal retention of archaeological sites. Due to this depth of deposit, subsurface archaeological deposits are frequently found below the ground surface regardless of the presence or absence of surface archaeological site distribution rapidly drops in spatial extent and complexity within 150 to 200 m. The ridges and hills between the drainage lines generally exhibit only minimal archaeological evidence. Previous studies have also concluded that the archaeological distribution is significantly effected by recent human activities and impacts.

While Pitt Town and McGraths Hill are technically within the Cumberland Plains, this model was designed based primarily on archaeological investigations in the Riverstone, Marsden Park, Mungerie Park and Kellyville, which has quite different morphology to the study area discussed here. In relation to the Pitt Town region, only elements of this model are likely to be true, since much of the area immediately surrounding the Hawkesbury River floods extensively and regularly. Therefore, there is likely to be a higher occurrence of archaeological sites on the surrounding ridges and hill tops than elsewhere in the Cumberland Plains (due to site survival if not actual historical occupation). Given many of these ridgelines are some distance from the river, site occurrence beyond 200 m is also likely. The presence of sandy deposits (either from alluvial deposition and/or Aeolian deposition) is also significant in determining site distribution in this region. Recent local studies at Bona Vista and Fernadell both indicated this to be the case. Hence, while the Cumberland Plain model is good generically, it does require some modification for the study area.

When considering the study area, it therefore seems likely that site distribution will be dominated by the presence of sandy pockets on elevated areas above water sources. Hence, in relation to the study area, key areas of concern include the lower slopes and hills adjacent Horton Creek and McKenzies Creek. Additional areas of interest may include some parts of Pitt Town Road, which is located on the eastern periphery of the ridgelines overlooking the Hawkesbury River and surrounding floodplain.

Importantly for this study is evidence of wind blown or Aeolian sands, which are commonly found on the headlands and ridge tops surrounding the Nepean River in this area. This type of deposit has exceptionally high potential for archaeological site occurrence and preservation,

The site inspection investigated the entire route of the proposed Rising Main, with specific reference to the crossings at Horton Creek and McKenzie Creek. In general, the site investigation revealed that the entire route has been extensively impacted by previous activities, including the development of residential and commercial structures, the installation of Cattai, Glebe and Pitt Town roads, and the canalisation of Horton Creek in some areas. The proposed rising main route runs for most of its length in the road verges of several of the main roads between Pitt Town and McGraths Hill, including Bathurst Street, Pitt Town Road, Windsor Road, Cattai Road, and Mulgrave Road. Hence, in most areas, the soil profile has been extensively modified and truncated by the construction of these roads, as well as the development of local and private drainage systems within the road verges. There are several areas where cutting and battering for these roads is evident, and in most cases this was observed to be in excess of 70 cm, which is the maximum depth that archaeological material has been found in this area. Other services, including a high pressure gas main and Telstra cables, were also noted running adjacent to the Pitt Town Road, and are likely to have caused disturbance in these areas to significant depths (3-4m below current ground level). Other developments, such as the golf

course (currently under construction) and nearby residential activities have also impacted any potential archaeological deposits that may have been present along the proposed pipe-line in some areas.

While the investigation did reveal numerous areas along Pitt Town Road that appeared to retain sandy deposits, they were all significantly impacted or truncated by modern activities. The remaining areas investigated were characterised by shallow or truncated duplex soils – an example of this being the area encompassing, and north of, Wellesley Road, which was initially thought to have archaeological interest, but which revealed an absence of in situ topsoil – the soil unit from which archaeological material is usually recovered - in most areas.

An aboriginal archaeological assessment and testing has been completed for the location of the pump station and a Section 90 consent has been received for work on the site (Consent and permit #2720) (Pers comm. Graham Wilson of AHMS). No further assessment, field work or other physical intervention is required though the mitigation measures described herein also apply to this area.

5.7.2 Potential Impacts

The main areas considered to have potential for the presence of items of aboriginal archaeological heritage are in the vicinity of the creek crossings. Horton Creek has been heavily modified near Old Pitt Town Road. There is clear evidence of canalisation, as well as development along both edges of the creek, and hence the area retains no archaeological potential. Similar findings were made for McKenzie Creek, where there is considerable evidence of flooding adjacent to the creek, and extensive drainage and residential development on the surrounding hill and ridge tops. These areas are mot likely to contain archaeological sites. It should be noted in both cases, the rising main is proposed to cross the creeks within areas of existing impact, i.e. immediately adjacent to the current road bridge crossings. The proposed southernmost crossing of Horton Creek from Wellesley Road to Glebe Road, where the proposed pipe line route crosses an intact lower slope to the north of the creek, was identified as being of archaeological interest. This area appeared to retain some integrity, and revealed only limited evidence of disturbance (based on visual inspection from Bathurst Street), although aerial photography does suggest at least one linear service running through it. Following known site distribution models (as outlined above), this lower slope does have moderate potential for archaeological materials to occur.

Extensive discussions have been undertaken between AHMS and Johnson Property Group in relation to this area north of Horton Creek. Given the timeframes of the project, the existing disturbance of the lower slope (in conjunction with the general absence of archaeological finds in the immediate area) and the proposed under-boring of the creek from some distance north of the lower slope, it is determined that this area, while of archaeological interest, requires no further investigation (since no impact is proposed) as part of this project. However, recommendations do require that the area is avoided by the construction team during the rising main's installation.

One area of the proposed rising main route, adjacent and directly north of Horton Creek near the corner of Pitt Town Road and Glebe Street), has been identified as having moderate archaeological potential. However, discussions with Johnson Property Group have indicated that this area will be under-bored from a location upslope to the opposite side of the creek, and hence this area is unlikely to be impacted (see discussion above).

5.7.3 Mitigation Measures

The following measures and controls are recommended to mitigate any potential impacts on aboriginal archaeological heritage:

The zone of moderate archaeological potential (Figure 4 of **Appendix F**) is to be avoided during the construction of the rising main through the installation of temporary fencing to the area north of Horton Creek (near the corner of Bathurst Street and Glebe Road) to ensure no direct or indirect impacts (such as truck parking or turning) occur during the construction activities. If works requiring excavation are proposed in the zone of moderate archaeological potential (shaded red in Figure 4), an AHIA will be required. The AHIA should seek to fulfil the DECC's (1997) *Aboriginal Cultural Heritage Standards*

and Guidelines Kit and (2004) Interim Community Consultation Requirements for Applicants to enable prompt application for the necessary excavation and impact permits, rather than to re-investigate the findings presented here.

No further action, insofar as Aboriginal heritage is concerned, is required within the remainder of the proposed rising main with the exception of the area identified as having moderate potential (Figure 4 of **Appendix F**).

Please note: it is an offence under Section 90 of the National Parks & Wildlife Act 1974 to disturb, destroy or deface Aboriginal objects without the Consent of the DECC. If any Aboriginal sites or objects are found during the course of development works within the subject land, excavation work in that area must cease immediately. If the Aboriginal object(s) cannot be avoided by development works (i.e. through re-design), a Section 90 AHIP from DECC will be required before work can recommence.

5.8 Non-Indigenous

5.8.1 Existing Environment

Non-Indigenous heritage was investigated within 200 m of the proposed pump station and rising main through desk-top searches. The following registers and lists were searched as part of this assessment:

- National Heritage List (Department of the Environment and Heritage).
- Register of the National Estate (Australian Heritage Council).
- National Trust Register (National Trust of Australia).
- State Heritage Register and Inventory (NSW Heritage Office).
- Hawkesbury Local Environmental Plan 1997 (Hawkesbury City Council).

The non-Indigenous heritage items within 200m from the pump station and rising main are described in **Table 14** and their location illustrated in **Figures 14 - 17**.

Name and Address (ID)	Description	Approximate Distance from Works	Listings
No 22, lot 1 DP986055 Bathurst St, Pitt Town	Samuel Cox's Cottage has local historical significance for its association with Samuel Cox, a one time alderman of Windsor Shire Council, and four generations of his family over a period of more than 100 years up to 1984.	200 m	HLEP 1989
	Samuel Cox's Cottage is a simple hipped roof slab cottage. It has a steeply pitched hipped roof, framed with timber poles. The internal walls and the original external walls are of hardwood slabs. The north wall has been replaced with weatherboards. The roof is of corrugated steel. A kitchen block is on the west side of the cottage.		
	The cottage has a skillion veranda on the east (front elevation) and a broad skillion addition on the south side. The rear veranda connects		

Table 14	Non-Indigenous heritage items within 200m of nump station and rising main
	non-indigenous neritage items within 200m of pump station and rising main

Name and Address (ID)	Description	Approximate Distance from Works	Listings
	the cottage to the kitchen wing. Two pencil pines frame the front entry of the house and can be seen from Pitt Town		
Huxley's Blacksmith Shop Pitt Town Road, Pitt Town No 292, lot 11 DP 10192	The former Huxley's Blacksmith shop is of historic significance as a rare surviving blacksmith's shop. The shop is important in serving the area from the late nineteenth century and surviving well into the twentieth century.	30 m	HLEP 1989
	The former Huxley's Blacksmith shop is a simple slab building set close to Pitt Town Road. Facing northwest to the road, it is a gabled building with a broad rear skillion and a broad skillion veranda on the front.		
No 96, lot 3, DP 242319 96 Pitt Town Road corner Wolseley Road,	The cottage has importance as a surviving Victorian cottage. Its nineteenth century character is reinforced by the slab wing to the rear. Located on a prominent corner, this cottage is a local landmark. This is a simple Victorian cottage of Flemish bond brickwork with a hipped roof of corrugated steel. A veranda on the northeast (Wolseley Street) elevation has a concave roof which is hipped at the ends. There is a rear skillion clad in weatherboards connecting the cottage to a small gabled slab wing, parallel to the house. The gable has scalloped barge boards. The house has two brick	30 m	HELP 1989
Mcgraths Hill Inn corner lot 1, DP 702263	chimneys with pointed cowls. Mcgraths Hill Inn is important both for the surviving Victorian inn and for the 1938 addition. The Victorian building, despite its modifications, retains the character and form of its period. The 1938 building is a good intact example of an inter-war hotel with art deco detailing.	30 m	HLEP 1989
	This is a two storey building with parapeted gable ends and a veranda on the south side facing Pitt Town Road. There are two chimneys on the east end. The walls are of Flemish bond brickwork and the roof is corrugated steel. The ground floor is divided into five bays with double hung windows alternating with doors. The openings are finished with rendered voussoirs to the flat arches over. The rear of the building is divided into four bays, each with a double		

Name and Address (ID)	Description	Approximate Distance from Works	Listings
	hung window.		

Source: Hawkesbury LEP 1989, State Heritage Register and Inventory, National Trust Register.

Figure 14 Site of Samuel Cox's cottage



Figure 15 Site of Huxley's Blacksmith shop





Figure 16 Site of Lot 3 on DP 242319



Figure 17 Site of Mcgraths Hill Inn



5.8.2 Potential Impacts

The proposed rising main is in the vicinity of four non-indigenous heritage sites (**Figures 14-17**) but the works are at least 30m away and will have no direct or long-term affect on these sites. No non-Indigenous heritage impacts or issues are anticipated as a consequence of the Proposal.

5.8.3 Mitigation Measures

Should any sites or items of heritage significance be encountered during construction, works in that area will cease and the area would be marked and protected. The Heritage Office will be contacted and, on their advice, an appropriate course of action would be developed and implemented.

5.9 Socio-economic and Landuse Considerations

5.9.1 Existing Environment

Any increase in development in the Pitt Town area would have a range of social and business effects depending on the extent of development. These effects would occur as a result of the residential development rather than the provision of sewage infrastructure which is the subject of this REF.

5.9.2 Potential Impacts

The construction program may cause temporary disruption to daily vehicle movements of local residents.

The construction programme may also generate short-term employment for several construction teams or contractors. There could be a minor short-term increase in retail activity in local shops as these employees and contractors pay for goods and services during the construction period.

5.9.3 Mitigation Measures

No mitigation measures are proposed.

5.10 Landscape Character and Visual Amenity

This section describes the landscape character and visual amenity in the study area. Since most works are underground, most of the visual impacts will be short-term only.

Landscape character units have been assigned in accordance with the existing land use pattern along the route. Significant visual impacts have been assessed based on the capacity for the landscape to absorb changes within the area. Existing features that dominate the visual setting at Bootles Lane and along the rising main route have also been considered.

5.10.1 Existing Environment

The landscape character along the works corridor is semi rural with open space and areas of native bushland in the road reserves. The topography and landform varies along the works corridor. In general, vegetated areas are situated at flat, low elevations (0 m to 10 m AHD). Residential areas are generally located on elevated ground along the works corridor.

5.10.2 Potential Impacts

5.10.2.1 Constructions Impacts

Impacts on the landscape character and visual setting are dependent on the landscape units through which the works corridor traverses. Impacts on landscape units are summarised in **Table 15** below.

Table 15 Impacts on landscape units

Landscape Unit	Potential Impacts
Residential	The rising main will be constructed primarily within existing and proposed road corridors. There will be visual impacts relating to the introduction of plant and equipment during construction. Impacts are considered to be temporary and largely associated with the construction works. The zone of visual influence during construction is expected to be limited to the area in the immediate vicinity of the pump station and rising main. For the most part, visual impacts are considered to be restricted to individual streets only during construction.
Commercial	There are existing detracting features within this landscape unit, and the installation of the works is considered to be a minor to negligible visual impact in relation to the existing visual characteristics of this area. Due to the nature of operations within commercialised areas, there is capacity for landscaped features within these areas to accept the visual impacts pertaining to RM PT1.
Open Space	There will be visual impacts during construction due to the open space characteristics of this area and consequently lack of screening for the installation works. Impacts are considered to be during construction only and may visually detract from the landscaped features in the area. This is particularly evident in parks and reserves which are located adjacent to watercourses, where elevations are flat and viewing distances are extended. The installation of the rising main on the edge of Brinsley Park would temporarily reduce the amenity of this area for sporting and recreation activities, however the reinstatement works would ensure that there is no long-term impact to the amenity of the park. Changes to the landscape character of this landscape unit would result from the presence of plant and equipment required either for the installation of the WWPS PT1 and RM PT1 and the need to excavate through proposed open trench construction techniques. The installation of the works would result in a temporary disturbance to grass in the open space areas. Impacts would be limited to the construction period only and short term during rehabilitation.
Natural Areas	There will be impacts due to the clearing of vegetation and the creation on an easement. Clearing of vegetation will create an immediate visual impact to the area because the presence of construction vehicles during installation would impact on the existing landscape character of the area, characterised by the undeveloped, natural features of the area. There will be a need to clear trees along the side of Bootles lane and there will be clearing of vegetation within the pump station location.

5.10.2.2 Operational Impacts

The only above ground structures are the pump station and odour control facility which will be a recessive green in colour and partially-screened with native vegetation. The rising main will be buried along its entire length. Once operational, it is not envisaged that there will be any adverse impacts on local landscape character and visual amenity, provided mitigation measures for rehabilitation are employed.

Long term visual impacts are expected to be evident in location of the pump station and along the unformed section of Bootles Lane. The potential exists for some minor alteration to the local visual setting in the Nature Reserve areas along the route. Such impacts are considered to be minimal and local amenity can be maintained by the planting of vegetation in areas disturbed by the construction works. It is expected that the trees to be removed for the rising main along Bootles Lane would ultimately require removal during future road construction.

5.10.3 Mitigation Measures

5.10.3.1 Mitigation Measures

The following measures and controls are recommended to mitigate any potential impacts on the local landscape:

- Construction areas will be designated and clearly defined to minimise disruption to the community and inadvertent clearance of vegetation.
- Vegetation to be removed for the purposes of works construction would be limited to that required for the construction and to achieve an appropriate level of safety.
- Surplus material would be removed from site when the construction phase is completed.
- The location of the rising main will be inside or adjacent to existing road corridors (where possible) to minimise the area of disturbance within open space and recreational areas.
- Reinstatement as early as possible across the entire length of the works corridor. .
- Vegetated areas to be rehabilitated appropriately. This would include the areas adjacent to the open trench for the works corridor that may have been disturbed by construction vehicles. From a visual perspective, reinstatement should return the area to the state in which it was preconstruction. This includes allowances for replacement of sub soil, topsoil, grasses, regrading and recontouring.
- Areas disturbed by open trench construction are reinstated to an adequate condition, i.e. no subsidence, erosion or vegetation die-back.

5.11 Waste Minimisation and Management

5.11.1 Existing Environment

Activities associated with the construction and operational phases of the Works have the potential to generate waste materials. Waste streams and waste types likely to be generated during construction and operation include:

- Excavated material (spoil and rock) unsuitable and / or not required for backfilling and restoration.
- Construction and process waste surplus materials from construction of WWPS PT1 and RM PT1 and general site reinstatement. Materials would likely comprise concrete, bentonite, gravels, sands, sand bags, fencing and barricades.
- General waste domestic refuse (litter) generated by onsite personnel and construction workers.
- Green waste vegetation and other such organic materials from clearance relating to working width preparation.
- Human waste mobile site toilets (sewage).
- Maintenance waste waste generated from site plant and vehicle maintenance (for example oil wash down wastewater).

Potentially hazardous waste types that may be generated during the construction and operation phases of the works include:

- Flammable liquids (oils and fuel).
- Flammable solids.
- Toxic substances.
- Corrosive substances.

Each of the waste streams will be managed throughout the duration of the works to satisfy three main aims:

- Appropriate disposal of chemical, fuel and lubricant containers, solid and liquid wastes that conforms to requirements of the DECC (EPA).
- Resource recovery and recycling is undertaken efficiently.
- Continual update and improvement of waste management throughout the development of the works.

5.11.2 Potential Impacts

The nature and volume of waste generated during the construction and operation of the works has the potential to impact upon the local environment if not managed appropriately. Inappropriately managed waste may have potential adverse impacts upon the following:

- Visual amenity and aesthetic quality of the area.
- Water quality of local drainage lines and watercourses.
- Health and safety of local residents, workers and visitors to the area.
- Proliferation and spread of noxious weeds disturbed during excavation of trenches if not properly separated and contained.
- Existing local waste collection services within the study area.

5.11.3 Mitigation Measures

Mitigation measures to reduce the potential impacts of waste generated during the construction and operation of the works on the local environment are detailed in the sections below. However, all mitigation measures proposed are subject to confirmation pending the development of a Resource and Waste Management Sub-plan, which would form part of the CEMP and be prepared prior to the commencement of construction activities.

In addition, in order to accurately identify management, transportation and disposal requirements of various waste streams it is necessary to classify wastes correctly. All waste will be classified in accordance with the *Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-liquid Wastes*, produced by the DECC (the then EPA) in July 1999 (the Waste Guidelines). This is the primary document used for the classification of wastes in NSW and provides specific guidance on the management and disposal of classified wastes (both liquid and non-liquid). Furthermore, the handling, storage and transport of hazardous materials and waste shall be in accordance with the National Code of Practice and the relevant Material Safety Data Sheet (MSDS) for the product.

5.12 Demand on Resources

5.12.1 Construction

Given the small-scale nature of the Proposal, the proposed construction works are not likely to place a significant demand on local resources. The key raw materials and utilities that would be used in construction of the Proposal include:

- Water used in mixing concrete and cement and for revegetation.
- Electricity to drive generators, lights, etc.
- Fuel petrol and diesel for machinery and plant.
- Oil for maintenance of machinery.
- Soil (imported topsoil for works and landscaping).
- Fill material to achieve design levels.
- Plant stockand mulch for landscaping works.

5.12.2 Operation

Only routine maintenance activities and repairs would be required during the operational phase of the development. Hence, once the works are commissioned, it is expected that the Proposal would place a very limited or negligible demand on resources.

5.12.3 Mitigation Measures

5.12.3.1 Material Use

The variety and abundance of material suppliers within the local area is such that there would be an adequate supply of resources throughout the construction phase of the works. The civil contractor is likely to choose materials suppliers based on cost and availability of materials, whilst considering transport and fuel costs. This would minimise fuel consumption and travelling times for vehicles associated with the works.

The recycling and re-use of materials would reduce the demand for resources than what would otherwise be expected from similar works in the absence of waste management protocols.

5.12.3.2 Energy Use

The most significant sources of energy consumption during the construction phase will be from plant and equipment using diesel and other fuels and from site offices using electricity.

In order to limit the consumption of energy, the following measures will be implemented, where possible:

- Limit idling time of plant and equipment whilst on site.
- Maintenance and servicing of plant and equipment to be undertaken as required by manufacturer's specifications to ensure plant is operating at maximum efficiency.
- Use appropriate energy efficient office equipment.
- Only security lighting to be left on after hours.

5.12.3.3 Water Use

Water use should be restricted wherever practicably possible. Specifically, water use should be conservatively utilised during its application to:

- The establishment of vegetation cover.
- Construction and maintenance.
- Vehicle washing.

5.13 Operational Hazards and Risks

5.13.1.1 WWPS PT1

Risks during operation of WWPS PT1 relate primarily to exposure to untreated sewage during sewage overflows. This would create the potential for the transfer of pathogens into surface water, and potential for impact on the quality of water. Serious overflow or persistent overflows would potentially affect flora and fauna located in the vicinity of WWPS PT1. There could also be minor risks to human health associated with overflows, where people frequently undertake social and recreational activities.

5.13.1.2 RM PT1

Risks during operation of RM PT1 relate primarily to leaking of untreated sewage affecting both surface and groundwater. This would create the potential for the transfer of pathogens into nearby

waterways, and potential for impact on the quality of water leading to potential human health problems associated with leaking of sewage.

5.13.2 Existing Environment

A search of the EPA Public Register under the POEO Act was undertaken in order to document whether the site has any licences which would identify activities that may give rise to potential contamination. The EPA public register does not list any licences associated with the study area at Pitt Town.

5.13.3 Potential Impacts

The works and operation of WWPS PT1 and PT1 is unlikely to increase the risk of contamination within the study area.

5.13.4 Mitigation Measures

The sewage pumping station will maintain a stand by pump as a backup in case one of the main duty pumps fail. The pump station will also include an alarm system which will notify Council operation personnel if the pumps fail or if there is a power failure. In a situation where there is a power failure a backup generator nearby can be easily switched over to and will be used to run the pumps. Also the proposed sewer carriers will have the capacity to carry 8 hours of dry weather flow, in case of an emergency overflow.

5.14 Cumulative Environmental Impacts

It is concluded that the potential benefits which will result from the construction of a new pump station and rising main, will outweigh any minor negative impacts that have been listed in this REF. All minor negative impacts will be minimised or ameliorated through implementation of the above noted mitigation measures.

5.15 Principles of Ecologically Sustainable Development

This section outlines recommended principles to ensure that development conforms with the principles of Environmentally Sustainable Development (ESD).

The key principles of ESD are:

- The precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Inter-generational equity, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
- Conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.
- Improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services.

The principles of ESD have been incorporated into the strategy design and environmental assessment of the sewage pump station and rising main. Examples of the integration of these principles are discussed below.

The *Precautionary Principle* has been demonstrated by locating the route of the rising main along the alignment of the existing sewer as far as practical, collocating the rising main with proposed road

upgrades and re-design to avoid the habitat of threatened species to minimise construction impacts. The sewage pump station is located in a cleared area to avoid removal of native vegetation. This sewerage strategy will be refined as part of the concept design process.

In terms of *inter-generational equity*, the pump station and rising main is consistent with long term plans for the Pitt Town region. Implementation of the pump station and rising main will replace existing on site disposal and increase the capacity of existing sewerage infrastructure. As a result, the proposal will provide a cumulative decrease in environmental and public health risks in the long term, and provide capacity for long term growth in Pitt Town.

Specialist studies have been undertaken to determine the *biological* and *ecological* extent and quality of resources within the study area. These studies have included flora and fauna investigations and environmental management assessments. The pump station and rising main alignment has been proposed to minimise direct impacts to ecological values. For example, thrust boring or drilling construction methods would be deployed at creek crossings to avoid impacts to water bodies and the route was re-designed to minimise impacts on biodiversity. Any impacts to ecological values will be minimised through the implementation of mitigation and control measures.

Improved valuation and pricing of resources has been considered throughout the option selection process. As the REF has not directly valued environmental resources, an indirect measure of the value of such resources is the cost of the proposed mitigation measures, which have been utilised when considering the viability of the sewage pump station and rising main.

6.0 Environmental Management

6.1 Summary of Proposed Impact Mitigation Measures

Table 16 provides a summary of all safeguards identified in the REF for the Proposal. Safeguards identified would be incorporated into the CEMP for the Proposal.

Table 16	Summary of	additional	environmental	mitigation	measures
	-			-	

Issue	Mitigation Measure
Topography, Geology and Soils	• An Erosion and Sediment Control Plan (ESCP) will be prepared in accordance with the requirements of the Council and Landcom "Managing Urban Stormwater; Soils and Construction" Manual 2004 prior to any works commencing at the site and will be maintained for the duration of the approval to prevent any sediment and dirty water entering any waterway. It would contain emergency procedures for high rainfall events that could increase soil erosion during construction.
	The ESCP would include the following mitigation measures as a minimum:
	• Installation of erosion and sedimentation control devices prior to excavation of the site. Erosion controls would remain in place until the bare soils and surfaces are stabilised (by revegetation or other means) and removed when redundant. This needs to include the diversion of 'clean' water around site in order to avoid treating it and also to avoid potential additional erosion from off site sources.
	• Appropriate erosion and sediment control devices would be placed downslope of all excavation works, spoil stockpiles or works that would disturb the ground surface, downslope of access roads that are highly utilised and in other areas as appropriate.
	• The area to be disturbed by construction activities would be minimised as far as possible.
	• Embankments and other areas subject to earthworks and grading would be revegetated with an appropriate cover crop as soon as possible following achievement of final levels. Where feasible, locally Indigenous plant species, including shrubs and groundcovers, would be planted in appropriate locations to assist in soil stabilisation following completion of construction. Maintenance of these plantings would include regular watering and appropriate weed control to ensure the plants survive and continue to enhance the site.
	• Daily visual inspections of erosion and sediment control devices to determine the condition and effectiveness of control measures. Immediate action would be taken to fix any control devices that have failed to work adequately.
	• Disturbed areas would be restored to original condition (sealed or covered with pebbles/gravel or vegetated, as appropriate) upon the completion of the works in that area.
	• Earthworks would be avoided or minimised during wet weather, in order to minimise water-induced soil erosion and increased sedimentation to the surrounding environment.

Issue	Mitigation Measure			
	 It is recommended that the construction access tracks be formed using a stabilised aggregate or crusher dust material that would be able to withstand significant flows during flood events without being susceptible to erosion and sedimentation of the flood water. This would assist with minimising potential water quality impacts on the surrounding environment. Dermal exposure of potential contaminants (such as hydrocarbons 			
	from leaked oil and diesel) can be minimised through proper use of personal protective equipment such as long sleeve shirts, long sleeve trousers, enclosed shoes and gloves.			
Hydrology and Water Quality	Appropriate erosion and sedimentation controls to be implemented during construction would be included in the ESCP and would incorporate the following measures:			
	 Handling of oils and fuels and the washing of all equipment, including all concreting equipment, would be undertaken within bunded areas or containers in accordance with DECC Bunding and Spill Management Guidelines. 			
	• Onsite refuelling if required will be conducted in accordance with a Refuelling Management Plan (RMP) developed with consideration to the environment. The RMP will include a risk assessment for fuelling of all plant including consideration of the following as appropriate:			
	- Appropriate refuelling locations.			
	- Proximity to infrastructure.			
	- Hoses.			
	- Couplings.			
	- Bunding.			
	- Track matting.			
	- Spill kits.			
	- Monitoring.			
	- Fill volumes.			
	• The EMP would include work methods to safeguard against hazards such as spills. Any fuel spillage would be reported, documented and immediately remediated. Collected contaminated material will be disposed of as per DECC waste guidelines.			
	• The conditions in the Controlled Activity Approval (CAA) would be adhered to (refer Appendix B for details).			
	• In the event of sewage over flows the pump station will maintain a stand by power source and pump as backup to the main power source and pumps, an alarm system to notify Council operation personnel and the proposed sewer carriers will have the capacity to carry 8 hours of dry weather flow, in case of an emergency overflow.			
Flora and Fauna	The potential impact of the Proposal on flora and fauna within the site is expected to be minimal provided the following mitigation measures are implemented during construction:			
	• The minimum practicable clearing of SGTF and trees would be conducted for construction purposes and threatened species would be avoided where feasible. Trenches in the vicinity of retained trees			

Issue	Mitigation Measure			
	are to be hand-excavated or bored and are to proceed only with approval of the site arborist. Hand excavation and boring would also be used to avoid the removal of threatened plants (i.e Downy Wattle <i>Acacia pubescens</i>). Any pruning of retained trees would be undertaken by the site arborist.			
	• The choice of equipment used in the installation of pump station and rising main would ensure that the minimum amount of disturbance would be required for access and earthworks in areas containing native vegetation.			
	• Earth-working equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from work areas to minimise the likelihood of the spread of weed seeds and plant pathogens.			
	• Suitable control measures would be implemented to prevent erosion and sediment deposition as per the CEMP.			
	• Where practicable, minor alterations to the path of the rising main would be made to minimise impacts on SGTF, threatened plants and retained trees.			
	• Temporary fencing would be placed between areas containing threatened plant species and SGTF to be retained to exclude earthworks. Fencing would be placed outside the drip-line of trees where possible.			
	• Regeneration and revegetation of disturbed areas on and adjacent to the construction areas would be conducted using local provenance plant species indigenous to the SGTF EEC. This would include the entire area (0.5 Ha) of exotic vegetation and poor condition SGTF adjacent to the pump station (see Figure 10) and the entire unformed section of Bootles Lane. Revegetation of existing road corridors and areas zoned as future roads would be restricted to the installation of a weed-free mulch and the planting of native grasses and other native groundcover vegetation to prevent erosion. Where the sewer main causes damage to public parks, turf should be replaced after backfilling is completed.			
	• Bushland regeneration would be conducted by a suitably qualified and experienced contractor after the end of construction works in all areas of retained vegetation and revegetated areas. Weeds, especially Kikuyu Grass and noxious weeds, must be adequately controlled prior to revegetation and maintained at a low (less than 90% of current) density during this period.			
	• The distance between open trenches and retained trees would be maximised within the constraints imposed by existing and planned infrastructure such as roads and other services.			
	• All trees requiring removal for the construction of the pump station and access road would be cut into manageable lengths for use in habitat augmentation within the adjacent SGTF remnant.			
	• All other native vegetation cleared would be mulched and stockpiled on site for later use in soil stabilisation and vegetation rehabilitation. Mulch would be stockpiled in disturbed vegetation adjacent to the pump station and/or rising main so as to minimise disturbance to native vegetation and the spread of weeds. Advice would be sought from an ecologist to determine suitable locations for stockpiles.			
	 An ecologist or suitably experienced and licensed bushland regenerator would be present for all tree-felling to collect seeds for 			

Issue	Mitigation Measure			
	use in revegetation.			
	 Excavated soil would be separated into topsoil and subsoil components and replaced in its original order during backfilling to facilitate regeneration and revegetation activities. 			
	 Retained trees would be monitored during vegetation rehabilitation and any signs of poor health reported to HCC and the site arborist in order to determine an appropriate course of action. 			
	 An ecologist would be present during the removal of any large woody debris in order to relocate any native fauna using this habitat to retained strands of SGTF. If any additional threatened species are discovered works would cease immediately. Advice would be sought from the Hawkesbury City Council ecologist and appropriate measures would be implemented to protect or relocate individuals of these species prior to the resumption of works. The discovery would also be reported to the DECC. Fallen logs would be relocated from earthworks areas to adjacent patches of SGTE under the supervision of an ecologist. 			
Air Quality	A Dust Management Plan (DMP) for the proposed construction works is recommended. The general principles of the DMP are as follows:			
	 All disturbed areas would be stabilised or revegetated as soon as practicable to prevent or minimise wind blown dust. Previously disturbed sites would be actively managed until they are no longer erosion prone. 			
	 All unsealed trafficable areas would be kept sufficiently damp during working hours to minimise wind blown or traffic generated dust emissions. 			
	 A water cart will be operated onsite for the duration of the works if required. 			
	 Stockpiles and handling areas would be maintained in a condition that minimises wind blown or traffic generated dust. Stockpiles stored for longer than six weeks would be covered. 			
	 All equipment for dust control would be properly maintained and kept in good operating condition. 			
	• Silt would be removed from behind sediment control fences and other erosion control structures on a regular basis, so that collected silt does not become a source of dust. The collected silt would be disposed of accordingly.			
	• Any dust, soil or mud deposited on public roads by subcontractors, construction activities and vehicle movements would be removed immediately by judicious sweeping. Material removed would be disposed of appropriately. Site access and egress would include a shaker and rubble pond to eliminate the amount of material tracked onto public roads by vehicles leaving the site.			
	 To avoid septicity and odour issues a chemical dosing facility at WWPS 'PT1' will be installed. 			
Noise	Specific noise mitigation actions must be implemented prior to commencement of the works. The following mitigation measures summarise the overall EPL and include other general recommendations:			
	A Noise and Vibration Management Plan would be developed, and			

Issue	Mitigation Measure			
	include all feasible and reasonable noise and vibration mitigation measures.			
	 In order to reduce and mitigate construction noise and vibration, strategies should be consistent with Australian Standard AS 2436- 1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites". 			
	 The Best Available Technology (and the Best Management Practices to minimise the extent of adverse acoustical and vibration impacts is to be employed. 			
	• The quietest available plant and equipment that can economically undertake the work required would be selected. All plant and equipment would be properly maintained and noise control measures implemented as specified by Australian Standard 2436- 1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites".			
	 Any equipment not in use for extended periods during construction work would be switched off and equipment would be properly maintained. 			
	 Where practicable, construction activities would be undertaken within standard DECC construction hours: 			
	- 7 am to 6 pm Monday to Friday.			
	- 8 am to 1 pm on Saturdays.			
	 No construction on Sundays or Public Holidays. 			
	 Vehicle movements outside normal construction hours, including loading and unloading operations, would be minimised where possible. 			
	 Where practical, the layout and positioning (including maximising the offset distance) of noise-producing plant and activities would be optimised to minimise noise and vibration emission levels on nearby residential receivers, e.g. minimising the occurrence of equipment 'clustering'. 			
	 A dedicated site/project officer would be provided as a 24-hour contact for any noise complaints during construction and operation of the Proposal. The site officer would facilitate a rapid response to any noise complaints and allow consideration of options for minimising or ameliorating noise. 			
	• Carrying out loading and unloading away from residential receivers.			
	 Temporary exclusion fencing should be installed to delimit the construction area. 			
	During normal operation, the pumping station noise will not exceed the environmental criteria as noise from the pumps will be negligible. The operational noise due to the emergency generator and pumps would exceed the environmental criteria however as the generator will only be operational during an emergency power outage or during testing (which will occur during the day) these noise levels are considered acceptable and no mitigation measures are proposed.			
Traffic and Access	Adequate provision for emergency access, pedestrian/cyclists routes and crossings, managing traffic during times of semi-trailer and large service vehicle site entry/exit, and temporary property access arrangements will be prepared.			

Issue	Mitigation Measure
	A Site Safety Plan and liaison with local emergency services will be required during the construction phase. Local emergency services will be given directions to, and the location of, the 'muster point' for emergency events.
	Immediately adjacent residents will be consulted during the development of this plan to ensure they are aware of the potential traffic impacts. A dedicated site/project officer will be provided as a 24 hour contact for any complaints.
Indigenous heritage	The zone of moderate archaeological potential (Figure 4 of Appendix F) is to be avoided during the construction of the rising main through the installation of temporary fencing to the area north of Horton Creek (near the corner of Bathurst Street and Glebe Road) to ensure no direct or indirect impacts (such as truck parking or turning) occur during the construction activities. If works requiring excavation are proposed in the zone of moderate archaeological potential (shaded red in Figure 4), an AHIA will be required. The AHIA should seek to fulfil the DECC's (1997) <i>Aboriginal Cultural Heritage Standards and Guidelines Kit</i> and (2004) <i>Interim Community Consultation Requirements for Applicants to enable prompt application for the necessary excavation</i> and impact permits, rather than to re-investigate the findings presented here. No further action, insofar as Aboriginal heritage is concerned, is required within the remainder of the proposed rising main with the exception of the area identified as having moderate potential (Figure 4 of Appendix F). Please note: it is an offence under Section 90 of the National Parks & Wildlife Act 1974 to disturb, destroy or deface Aboriginal objects without the Consent of the DECC. If any Aboriginal sites or objects are found during the course of development works within the subject land, excavation work in that area must cease immediately. If the Aboriginal object(s) cannot be avoided by development works (i.e. through re-
Non-Indigenous heritage	recommence. Should any sites or items of heritage significance be encountered during construction, works in that area will be stopped until appropriate consultation and approvals have been obtained.
Socio-Economic and Land Use	A Traffic Management Plan would be implemented to mitigate any impacts to traffic movements during construction.
Visual Impact and Landscape Considerations	As part of the Erosion and Sedimentation Control Plan, all exposed soils and surfaces disturbed by construction are to be stabilised, through revegetation or other means. These measures will have the dual effect of reducing visual impacts in the post construction phase of the Proposal. In particular, plantings on any batters will improve the screening of the pump station and the overall visual quality of the study area.
Waste Minimisation and Management	As a minimum, the Resource and Waste Management Plan would include the following actions:
	Waste materials would be classified in accordance with the DECC's Waste Guidelines.
	Materials would be recycled wherever possible. Cleared vegetation or other material may also be recycled where feasible or otherwise

Issue	Mitigation Measure
	disposed of at an appropriate site.
	 Materials would be sourced so as not to result in the creation of excess waste.
	 Transportation and disposal requirements for industrial (and if identified, hazardous) waste types to an appropriately licensed waste disposal facility.
	 Secure rubbish bins, with lockable lids would be provided on site, which would be regularly emptied by the supplying contractor.
	 Site is to be kept clean and tidy and regular housekeeping inspections will be carried out and waste removed on a regular basis.
	 The site would be left tidy and rubbish free on completion of the works.

7.0 Consideration of Environmental Factors

7.1 Clause 228 Checklist (NSW Legislation)

The following factors, listed in Clause 228(2) of EP&A Regulation 2000, are required to be considered to assess the likely impacts of the Proposal on the natural and built environment.

Table 17	Clause 228 checklist	(summary o	of environmental	impacts under	NSW legislation)
		(, ·			

Factor	Impact
a) Any environmental impact on a community? The construction of the works will ultimately improve the ambient environment for the local community by providing reticulated sewage for new development as well as existing unsewered properties.	Long term +ve
The potential impact of noise exceedances will be reduced by mitigation measures. Operation of the pump station will not exceed guidelines	Short term -ve
b) Any transformation of a locality? Only the pump station's small electrical cubicle and odour control facility will be above ground. Because of their recessive green colour and native plantings, these will blend into the locality.	neutral
c) Any environmental impact on the ecosystems of the locality? Some removal of degraded threatened ecological communities and flora and fauna habitat would be required for the proposed action. Construction works will be managed to minimise the extent of vegetation removal and associated indirect impacts. Mitigation measures would improve the condition of remaining vegetation.	Short term -ve Long term neutral
 d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? There is potential for minor noise and dust impacts to reduce the aesthetic quality of the area during construction. However this will be short term. Visual impacts are negligible. Impacts on flora and fauna habitat are chiefly within land that is to be affected by future road development. 	Short term -ve
 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? Sites have been cleared previously. No significant impacts have been identified or considered likely to occur.,. There are several known non-Indigenous heritage items along the route of the rising main. These would not be affected due to the substantial separation distance 	Pending further study Neutral
 f) Any impact on the habitat of any protected or endangered fauna within the meaning of the National Parks and Wildlife Act 1974? Some removal of degraded native fauna habitat would be required for the proposed action. Construction works will be managed to minimise the extent of vegetation removal and associated indirect impacts. Mitigation measures would improve the condition of remaining vegetation. Ecological investigations conducted for the REF conclude that there would likely be some impact on habitat for protected and endangered fauna. This impact is not likely however to significantly affect the conservation status of these species. 	Short term -ve Long term neutral

Factor	Impact
 g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Investigations undertaken for the REF conclude that the Proposal may cause impacts on flora and fauna, including threatened species. However the extent of impact would not be sufficient to significantly affect the conservation status of any species. 	Short term -ve Long term neutral
 Any long term effects on the environment? Connection of unsewered properties will have a long term positive effect on water/ groundwater quality. 	Long term +ve
 i) Any degradation of the quality of the environment? There is potential for minor short term environmental degradation in terms of noise, dust and increased traffic on local roads during construction. Mitigation measures outlined in the REF would ensure that impacts are limited to minor short term impacts and are managed within levels set by regulatory authorities. 	Short term -ve Long term neutral
j) Any risk to the safety of the environment? Environmental and community safety would be paramount during the construction and operation of the Proposal.	Long term neutral
k) Any reduction in the range of beneficial uses of the environment?The works will not affect the use or potential use of the locality.	Long term neutral
I) Any pollution of the environment? There is minor potential for short term negative impacts during construction, however the mitigation measures documented in this REF would ensure that this potential is effectively managed.	Short term –ve
m) Any environmental problems associated with the disposal of waste? Minimal waste will be produced in this project. A Resource and Waste Management Plan would be prepared as part of the CEMP to manage waste to ensure compliance with NSW DECC requirements during construction. Waste would be reused or recycled where possible and the mitigation measures contained in this REF would ensure that there would be no impacts associated with the disposal of waste.	Long term neutral
 Any increased demands on resources, natural or otherwise, which are, or are likely to become in short supply? The proposal has no requirement to utilise any materials in short supply. 	Long term neutral
 Any cumulative environmental effect with other existing or likely future activities? Other developments have the potential to accumulatively degrade the environmental qualities of the Pitt Town area. These cumulative environmental effects include the removal of native vegetation, effects from The Proposal construction works (air and water quality) and a change in the character of the semi-rural area. 	Long term -ve
However, the Proposal would contribute to positive cumulative environmental effects for the area by providing the health and water quality benefits of providing reticulated sewage for existing unsewered properties and future residential development.	Long term +ve

7.2 EPBC Act 1999 (Commonwealth Legislation)

Under the environmental assessment provisions of the EPBC Act, the following matters of National Environmental Significance (NES) are required to be considered with regards to the Proposal.

Table 18	Summary of matters of national environmental significance (NE	S)
	· · · · · · · · · · · · · · · · · · ·	-,

Factor	Impact
a) Any environmental impact on a World Heritage property? Assessments conducted as part of this REF have concluded that there would be no impact on a World Heritage Property as a result of the Proposal.	Nil
 b) Any environmental impact on National Heritage places? No National Heritage Places are present. 	Nil
c) Any environmental impact on wetlands of international importance? There are no wetlands of international importance in the immediate vicinity of, or likely to be affected by the Proposal. No impacts have been identified.	Nil
 d) Any environmental impact on Commonwealth listed threatened species or ecological communities? Some removal of degraded threatened flora and fauna habitat would be required for the proposed action. Construction works will be managed to minimise the extent of vegetation removal and associated indirect impacts. Mitigation measures would improve the condition of remaining vegetation. Threatened species as listed on the EPBC Act may utilise resources in the area and surroundings. Investigations carried out as part of this REF have concluded that impacts would not significantly affect the conservation of these species. 	Short term -ve Long term neutral
e) Any environmental impact on Commonwealth listed migratory species? Migratory species as listed on the EPBC Act may utilise resources in the area and surrounding, however investigations carried out as part of this REF have that impacts would not significantly affect the conservation of these species.	Short term -ve Long term neutral
f) Does any part of the proposal involve a nuclear action? There are no nuclear actions involved in any part of the Proposal.	Nil
g) Any environmental impact on a Commonwealth marine area? The Proposal would not be located within any Commonwealth marine area and it is not anticipated that there would be any direct or indirect impacts upon a Commonwealth marine area.	Nil
In addition; any impact on Commonwealth Land? There would be no direct or indirect impact on any Commonwealth land as a result of the Proposal.	Nil

8.0 Conclusion

Key impacts are minor disruptions to traffic, construction noise and dust and clearing of native vegetation within land zoned for future road development.

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment.

Based on the assessment contained in this REF, it is considered that under section 111 of the EP&A Act a significant impact on the environment is unlikely and therefore an Environmental Impact Statement (EIS) is not required.

9.0 References

DEC 2001 Approved Methods and Guidance: For the Modelling and Assessment of Air Pollutants in New South Wales NSW Department of Environment and Conservation (now DECC).

DEC 2004 AAQ NEPM Annual Compliance Report 2003 NSW Department of Environment and Conservation (now DECC).

DECC 2008 Threatened species, populations and ecological communities of NSW – Species Profiles. Threatened species Website <u>http://www.threatenedspecies.environment.nsw.gov.au/index.aspx</u> NSW Department of Environment and Climate Change.

Harden 2007 Flora of New South Wales (Volumes 1-4). University of New South Wales Press.

Lands 2006 *East Coast Aerial Photos (Med-High resolution)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

Lands 2007 *Topographic maps (Current Series)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

Maunsell 2007. *Pitt Town Sewerage Strategy Report. Pitt Town Sewerage Strategy.* Report prepared for Johnson Property Group Pty Ltd by Maunsell Australia Pty Ltd

NPWS 2002 Native Vegetation of the Cumberland Plain, Western Sydney NSW National Parks & Wildlife Service – 1:25 000 Map Series


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Appendix A Proposed Sewage Pump Station and Rising Main Alignment Plans













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Appendix B Controlled Activity Approval and Environmental Protection License



1 1 MAR 2008

Johnson Property Group 340 Kent Street SYDNEY NSW 2000 Department of Water & Energy

Contact: Greg Brady Phone: 9895 7441 Fax: 9895 7501 Email: greg.brady@dnr.nsw.gov.au

Our ref: ERM08-7712 File:

Your ref:

Attention: Mr Greg Moore

7 March 2008

Dear Sir

RE: New Controlled Activity Approval- to undertake works for a sewer main on waterfront land for McKenzies, Horton Creeks and tributary of Hawkesbury River – Pitt Town and McGraths Hill, NSW.

I refer to your application dated 4 February 2008, for a permit issued under Part 3A of the Rivers and Foreshores Improvement Act 1948 for the subject works. This has been repealed and replaced by a Controlled Activity Approval under the Water Management Act 2000.

Receipt is acknowledged of the Permit Fee of \$1615. The attached Controlled Activity Approval (CAA) has been issued for a period of **5 years**, subject to conditions, and expires on **7 March 2013**.

It is important that you carefully read the conditions and request clarification from the Department of Water and Energy (the Department) of any condition that is not fully understood.

Please note that this CAA must be kept current until all works, rehabilitation and maintenance conditioned by the CAA have been completed. To ensure timely renewal, you should make your application in writing to the Department at least one month before the expiry date. If you require amendments to this permit, extra charges will occur. Contact the Department before-hand for advice on the renewal fee and charges.

Please contact Greg Brady on telephone 9895 7441 if you would like to go over any of the above requirements.

Yours sincerely M

Greg Brady Natural Resource Officer Compliance and Licensing, Parramatta

Attached. CAA

[Level 11, 10 Valentine Avenue - Parramatta NSW 2150 P O Box 3720, Parramatta NSW 2124 Telephone (02) 9895 7657 Facsimile : (02) 9895 7501 NSW Government

Department of Water & Energy

WATER MANAGEMENT ACT 2000 CONTROLLED ACTIVITY APPROVAL

for controlled activity on waterfront land in New South Wales

REFERENCE NO:					FILE NO:					
CONTROLLED	ACTIN	ITY API	PROVAL ISS	UED T	0:					
Name of Approval	Holder:	Greg Mc	ore							
Postal Address:		PO Box /	PO Box A1308							
		Town/Ci	ty SYDNEY Sou	P/Code	1235					
Company Name:	127	Johnson	Property Group		-					
Office Address:		340 Kent Street								
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Department of Water & Energy

5. - 19. NA

- 20. The approval holder must notify DWE in writing within 21 time if controlled activity works are to be:
 - suspended for a period, or
 - terminated before their full completion, or
 - resumed after suspension.

21.-31. NA.

- 32. The approval holder must not leave materials which could obstruct the flow of water or damage river banks on waterfront land at any time.
- 33. The approval holder must remove surplus material when operations cease and the controlled activity is completed.

34. - 41. NA

42. The approval holder must implement erosion and sediment control measures in accordance with the requirements of Council and the Landcom "Managing Urban Stormwater; Soils and Construction" Manual 2004 prior to any works commencing at the site and must maintained for the duration of the approval to prevent sediment and dirty water entering the waterway.

43. - 68. NA

Date

PERIOD OF APPROVAL:

DATE OF ISSUE:

DATE OF EXPIRY:

CONDITIONS OF APPROVAL: This controlled activity approval is granted subject to the conditions listed.

- 1. Watermain extension, Pitt Town Road (McGraths Hill) to Bootles Lane (Pitt Town), Case 104475pw, sheets 1 to 6, amendment 4, , dated 21/1/08, by Sydney Water
- Proposed Sewer Rising Main from Pt.1, job No 10-20978 Pitt town Rd-RM, sheets 1 to 10, amendment 2, dated 21/1/08, by RAR.
- Environmental Management Plan for Construction within Creeks, dated January 2008, issue 1, rev 0, by CLM excavations.

CONTROLLED ACTIVITY APPROVAL ISSUED BY:

Greg Brady Natural Resource Officer Compliance and Licensing Division, Parramatta



Address all correspondence to: Greg Brady Natural Resource Officer Department of Water and Energy PO Box 3720 PARRAMATTA NSW 2124

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Department of Environment & Climate Change NSW

Our reference : Licence No. 12883

JOHNSON PROPERTY GROUP PTY LIMITED PO BOX A1308 SYDNEY SOUTH NSW 1235

2 8 MAY 2008

Attention: MR. KEITH JOHNSON

22-May-2008

Dear MR. JOHNSON,

ENVIRONMENT PROTECTION LICENCE

I refer to the application for the issue of an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* lodged by JOHNSON PROPERTY GROUP PTY LIMITED on 17-Apr-2008.

The Environment Protection Authority (EPA) has carefully considered the application and has decided to issue a Scheduled Activity - Premises Based licence. Environment Protection Licence No. 12883 is contained in the enclosed *Licence and Compliance Kit for Licence Holders* folder. The folder also contains the following important information:

- a receipt for the licence application fee submitted with the application;
- an introduction containing information relating to the licence and kit;
- an Annual Return, comprising a Statement of Compliance and a Monitoring Summary Report and (if applicable) Load-based fee calculation worksheets, which must be submitted to the EPA annually in accordance with the licence conditions;
- 4. Annual Return instructions to aid you in completing the Annual Return and complying with any load-based licensing requirements; and
- (if applicable) the Load-Based Licensing Load Calculation Protocol which contains important requirements for calculating pollutant loads.

We are committed to assisting the licensed community to meet its obligations under the *Protection of the Environment Operations Act 1997.* If you have any questions relating to the licence, fees or your load-based monitoring and reporting requirements please contact your local EPA regional office as indicated on the front page of the licence.

Yours sincerely

MS GILLIAN REFFELL Unit Head - Metropolitan Infrastructure Section Environment Protection and Regulation Group Department of Environment and Climate Change (NSW)

Please note that the Department of Environment and Climate Change exercises certain statutory functions and powers in the name of the Environment Protection Authority (EPA).

PO Box A290 Sydney South NSW 1232 59-61 Goulburn St Sydney NSW 2000 Telephone (02) 9995 5000 Facsimile (02) 9995 5999 ABN 30 841 387 271 www.environment.nsw.gov.au

Staff of the Department perform the functions of the National Parks and Wildlife Service and the Environment Protection Authority

Environment Protection Licence



JOHNSON PROPERTY GROUP PTY LIMITED PO BOX A1308, SYDNEY SOUTH, NSW

Licence And Compliance Kit (for licence holders)

This kit contains your Environment Protection Licence and materials to help explain your licence and related obligations.

Please check that this package contains the items below. Use the binder supplied to keep your current documents and to store documents for at least four years as required.



Environment Protection Licence

Depa	artment of Environment &	k Climate Change NSW
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Understanding your package

Your licence

Your Environment Protection Licence shows what you must do, must not do and may do under the Protection of the Environment Operations Act 1997.

Load Calculation Protocol

If your licence is subject to load-based licence fees, a protocol is included which sets out the methods that may be used to calculate your emissions of assessable pollutants. We don't need to see the load calculation workings, only the final load figures. However, you are required to keep records of the load calculations for auditing by the EPA.

Annual Return

All licence holders must submit an Annual Return no later than 60 days after the anniversary date of their licence. The Annual Return is a declaration where you advise the EPA whether you complied or did not comply with the requirements of your licence.

Where monitoring is required by your licence, you must enter a summary of the results in the Annual Return, using the table(s) provided.

For licences subject to a load-based licence fee, the load fee must be calculated using the worksheets provided in the Annual Return. Payment of the load based fee must be sent to the EPA no later than 60 days after the anniversary date of the licence.

Instructions explaining how to complete the Annual Return are enclosed.

Penalties for lateness

The fees increase significantly if payments are not received by the due date. Details of load-based fees are shown on the applicable worksheets of your Annual Return.

There are also automatic penalties for late or non-submission of Annual Returns.

Annual Return Instructions

Completing your Annual Return

After the end of the reporting period you are required to complete an Annual Return. The reporting period for your licence is specified in the licence.

The Annual Return has five sections:

- A Licence details
- B Monitoring and Complaints Summary
- C Statement of Compliance
- D Statement of Compliance Load-based fee calculation worksheets (if applicable)
- E Signature and certification

To correctly complete your Annual Return you will need to refer to these instructions and, if applicable, the Load Calculation Protocol.

Date of lodgement

The Annual Return **must** be lodged within 60 days from the end of the reporting period.

Department of Environment & Climate Change NSW

Licence fees

There are two parts to your licence fee:

- 1 an administrative fee which is due within 60 days of the beginning of the reporting period. You will be sent an invoice for this amount.
- 2 a load-based fee which is due within 60 days of the end of the reporting period. You calculate this fee by using the worksheets in section D.

Your load-based fee for the reporting period and the administrative fee for the *following* period may be submitted at the same time.

If you are completing the Annual Return because the licence is being transferred, surrendered or revoked:

- you do not need to pay a further administrative fee, and
- you may need to remit the load-based fee to the EPA if there are assessable pollutants identified for the licence.

Penalties

Penalties of up to \$250,000 for a corporation or \$120,000 for an individual may be imposed for supplying false or misleading information in a Monitoring Summary Report or certifying a Statement of Compliance that is false or misleading.

A penalty is applied for late payment of the licence fee. There is a penalty of 5% on the amount due for every fortnight that the payment is late.

For further information

These instructions are to assist you in completing your Annual Return. If further information is required please contact us on 02 9995 5700.

Annual Return Instructions

Section A

Statement of Compliance

Licence Details

The EPA records the details of your licence when it is issued or when a variation of the licence is granted. These details are included in Section A.

If there is a change to the "Licence Holder" you must advise the EPA immediately. The licence may need to be transferred.

If there are changes to any other item in section A you must apply to the EPA for a variation to your licence. Your licence is not varied until you receive official notice in writing of the variation.

The EPA also retains additional information relating to the licence that may not appear in the Annual Return. If there are any changes in the following information, please advise the EPA in writing:

the identity and details of the contact person for the licence holder

the postal address and facsimile number for service on the licence holder. Department of Environment & Climate Change NSW

Section B

Monitoring and Complaints Summary

Your licence may require you to provide a Monitoring and Complaints Summary at the end of each reporting period.

In section B, you need to:

record the number of complaints, and;

Note: You should keep a record of the details of all pollution complaints as required by **condition M4** of your licence in relation to pollution from or on the premises or associated with activity to which your licence applies.

complete the *Monitoring and Complaints Summary*. For each monitoring point, complete the details for each pollutant (a table for each monitoring point is provided for you to fill in).

Section C

Statement of Compliance

Licence conditions

Section C relates to your compliance with the conditions of the licence during the relevant reporting period.

A single question requires a "yes" or "no" answer. If you answer "no" then additional information must be supplied on separate pages. Use as many pages as needed to provide all of the information that is required.

All attached pages must be initialled by the person(s) that certifies the Statement of Compliance.

Annual Return Instructions

Section D

Statement of Compliance

Load-based fee calculation worksheets

Schedule 1 of the *Protection of the Environment Operations (General) Regulation 1998* lists activities that are subject to load-based fees.

If your licence is not subject to a load-based fee, go to section E of the Annual Return.

To complete the calculation of the load-based fee component of your licence fee, you must use:

- the Load-based fee calculation worksheets in the Annual Return, and
- the information contained in the relevant Load Calculation Protocol(s).

The worksheets are customised to your particular licence to make the calculations we require as straight-forward as possible.

There may be one or more separate worksheets for each assessable pollutant as well as summary pages for totalling the pollutant fees payable.

For each assessable pollutant, calculate the Pollutant fee by following steps D1 to D5

D1 Pollutant load of an assessable pollutant

Copy onto the worksheets, the actual, weighted and agreed loads of each assessable pollutant that you calculated in accordance with the Load Calculation Protocol.

You must also indicate the method used to determine the pollutant load.

The **"actual load**" is summarised in sections 2, 3 and 4 of the Protocol. It is the amount of the assessable pollutant discharged as calculated using the method specified in the Load Calculation Protocol.

The "weighted load" is summarised in section 5 of the Protocol. It is the actual load adjusted for any load weighting measures specified in the Load Calculation Protocol. These weighting measures reflect any steps that you might have taken to reduce environmental harm without necessarily reducing the total pollutant load discharged. Weighting measures that may be applicable to you are explained in section 5 of the Protocol.

Department of Environment & Climate Change NSW:

The **"agreed load**" means a load agreed by you and the EPA under a load reduction agreement. Agreed loads are explained in greater detail in section 6 of the Load Calculation Protocol.

If you have more than one fee-based activity classification, list the actual, weighted and agreed loads for each activity in the space provided on the worksheets.

D2 Assessable Load

The assessable load for an activity is the smallest of the actual, weighted or agreed load.

If you have more than one fee-based activity classification listed in D1, the assessable load of your pollutants is the sum of the assessable loads for each activity classification.

D3 Calculate the Fee Rate Threshold (FRT)

The Fee Rate Threshold (FRT) is the amount of an assessable pollutant that may be discharged during the licence fee period and charged at the normal rate. Any discharges above the threshold are charged at a higher rate.

FRT is calculated by multiplying the actual quantity of activity during the licence fee period by the FRT factor for the assessable pollutant for the activity classification.

The actual quantity of activity must be expressed in the units of measure specified in respect of the fee-based activity classification listed in A7.

The worksheets have been pre-printed with:

- each applicable fee-based activity classification for your licence,
- the FRT factor for each fee-based activity classification.

Calculate the FRT for each fee-based activity classification. If you have more than one classification, total the FRT for each activity to obtain the FRT for that pollutant.

Annual Return Instructions

Adjustment for type of receiving waters

Fee rates for assessable water pollutants differ depending on whether the discharge of the pollutants is to:

- enclosed waters, or
- estuarine waters, or
- open coastal waters.

If you told us that you only discharge pollutants to one type of receiving waters, you will only receive one set of worksheets for each assessable pollutant.

If you told us that you discharge pollutants to more than one type of receiving waters, you will need to pro-rata the percentage discharge to each, eg. total phosphorus discharged to enclosed waters, and total phosphorus discharged to estuarine waters.

D4 Apply the Fee Rate Threshold

This calculation determines how much of the discharge is to be charged at the normal rate and at the higher rate.

If the Assessable Load (step D2) is greater than FRT (step D3), calculate AL¹ as shown.

D5 Calculate fee for assessable pollutant

Calculate the Pollutant fee as shown and copy it to step D6.

If the Assessable Load is greater than the FRT (step D4) use AL¹, otherwise use AL (step D2).

The Calculation Factor has been calculated and pre-printed on worksheets.

The "**pollutant fee unit amount**" is specified in the *Protection of the Environment Operations* (General) Regulation 1998.

The "**pollutant weighting**" varies according to the toxicity of the pollutant - the more toxic the pollutant, the higher the weighting.

The "critical zone weighting" varies according to the location into which the pollutant is discharged. It reflects the need for greater pollution reduction efforts in areas where there are significant impacts arising for those pollutants. The critical zone weightings on the worksheets are based on the local government area and catchment area information you Department of Environment & Climate Change NSW

provided to us. If you discharge pollutants in other locations please contact the EPA.

D6 Load-based Fee

Total the pollutant fees for all your assessable pollutants and subtract the amount of the administrative fee already paid for the licence fee period.

The administrative fee should have been paid to the EPA within 60 days at the beginning of the licence fee period. It is deductable from the amount of the load-based fee.

D7 Interest payable for late payment

If your payment will be received by the EPA by the due date, go to step D8.

If you know that your payment will be late, calculate the interest payable as shown on the Worksheet. The penalty is 5% of the amount due for every fortnight that the payment is late.

D8 Payment due

If applicable, add any late payment penalty to the Load-based fee calculated at step D6. This is the amount due for your load-based fee.

Payment should be sent with your Annual Return. Make cheques payable to 'NSW Environment Protection Authority'.

Page 4

Annual Return Instructions

Section E

Signature and certification

Before signing section E, the licence holder must ensure that a person with the proper authority has completed the information in the:

- Monitoring and Complaints Summary (section B) and
- Statement of Compliance (sections C and D).

The Annual Return may only be signed or certified by:

- the licence holder, or
- a person who has been authorised by the licence holder to sign or certify and approved in writing by the EPA.

The EPA grants general approval and specific approval.

Persons who have been approved by the EPA, to sign the Annual Return on behalf of a licence holder are listed in section E.

If a person has not been approved by the EPA, the licence holder must apply to the EPA for a specific approval. An *Application for EPA approval of a delegate* form can be obtained from the EPA.

Do not certify any Statement of Compliance or sign any Monitoring Summary Report until you have written notice of EPA approval for you to do so.

Checklist

 Check that the details in section A are correct. If incorrect, notify the EPA or apply for a variation promptly.

Department of Environment & Climate Change NSW

- Check that you have correctly completed sections B to D.
- Check that authorised person/s have signed the Monitoring and Complaints Summary and certified the Statement of Compliance in section E.
- Make a copy of the completed Annual Return and keep it with all your licence monitoring and load calculation records, to be provided to the EPA if required.
- Unless you have paid separately, attach a cheque for the payment of:
 - the load-based fee for the reporting period
 - the administrative fee for the next licence fee period.
- Send the Annual Return to the EPA within 60 days at the end of the Reporting Period to:

Licence Administration and Revenue Unit NSW EPA PO Box A290

SYDNEY SOUTH NSW 1232

Page 5

Annual Return Instructions

Reduce harm to the environment and pay a lower fee

The purpose of the load-based fee is to provide ongoing incentives for the reduction of the environmental harm caused by pollution.

Set out below are three methods that licence holders might use to reduce their load-based fee.

1 Reduce your loads by cleaner production

Cleaner production is a business practice that focuses on minimising resource use and avoiding the creation of pollutants, rather than on trying to manage pollutants after they have been created.

A good starting point for reducing pollutants is to review your resource inputs, production processes and outputs to identify cleaner production opportunities. These could include improved housekeeping, materials substitution, changes to processes or technology and reuse/recycle of materials onsite.

The EPA has established a Cleaner Industries Unit to encourage more businesses to adopt cleaner production practices. The Unit has information and case studies on the successful application of cleaner production and can be contacted through the EPA's Pollution Line on 131 555.



2 Change the manner of discharge

It may be possible to discharge pollutants in ways which minimise the environmental impact of the discharge. For example, waste-water could be reused. Discharges into a river could be timed to coincide with high water flows.

The EPA allows discounts for implementation of load weighting measures specified in the Load Calculation Protocol. Currently available loading weighting measures are explained in the Load Calculation Protocol. The EPA also welcomes additional suggestions to introduce other load weighting measures which reflect new practices which reduce environmental harm.

3 Load reduction agreements

If you plan to invest in cleaner technology or management practices which will improve your future environmental performance, you may be able to pay lower fees now. This means that you keep some of the money you would otherwise pay as fees, to help reduce pollutant loads.

You can establish a load reduction agreement (LRA) with the EPA, and agree on a completion date for achieving lower pollutant loads. We will negotiate "agreed" loads with you, based on the agreed future lower loads. You use these agreed loads in the fee calculations and therefore pay a lower fee. If the terms of the LRA are not met, fee savings must be repaid.

Contacts

Department of Environment & Climate Change NSW

Department of Environment and Climate Change

PO Box A290 SYDNEY SOUTH NSW 1232

Phone: 02 9995 5000 Fax: 02 9995 5922

Department of Environment and Climate Change Regional Offices:

Albury	- Phone	02 6022 0600
Armidale	- Phone	02 6773 7000
Bathurst	- Phone	02 6332 7600
Grafton	- Phone	02 6640 2500
Griffith	- Phone	02 6969 0700
Newcastle	- Phone	02 4908 6800
Queanbeyan	- Phone	02 6122 3100
Sydney	- Phone	02 9995 5000
Wollongong	- Phone	02 4224 4100

After hours emergencies

Phone 131 555

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Department of Environment & Climate Change NSW

ANNUAL RETURN

LICENCE NO.	12883	
LICENCE HOLDER	JOHNSON PROPERTY GROUP PTY LIMITED	
REPORTING PERIOD	22-May-2008 to 21-May-2009	

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD ____/ to ___/

(Note: the revised reporting period also needs to be entered in Section E)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 21-Jul-2009

Your Annual Return must be completed, including certification in Section E, and submitted to the EPA no later than <u>60 Days</u> after the <u>end of the reporting period</u> for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

the issue of a Penalty Notice for \$750 (individuals) or \$1500 (corporations);

OR

prosecution.

Please send your completed Annual Return by Registered Post to:

Licence Administration and Revenue Unit Department of Environment and Climate Change PO Box A290 SYDNEY SOUTH NSW 1232

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the Protection of the Environment Operations Act 1997.

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Department of Environment & Climate Change NSW



Use the checklist below to ensure that you have completed your Annual Return correctly

(√ the boxes).

		CHECKLIST
٥	Section A:	All licence details are correct
٥	Section B1:	You have entered the correct number in the complaints table
٥	Section B2 - B3:	If there are tables, you have provided the required details
	Section C:	You have answered question 1, and 2 if applicable
0	Section D:	If applicable, you have completed all load calculation worksheets
0	Section E:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
	Make a copy of the	e completed Annual Return and keep it with your licence records
0	Attach a cheque (u the administrat if applicable, th	inless you have paid separately) for the payment of: ive fee for the next licence fee period e load-based fee for the licence fee period covered by this Annual Return

Please send your completed Annual Return by Registered Post to:

Licence Administration and Revenue Unit Department of Environment and Climate Change PO Box A290 SYDNEY SOUTH NSW 1232

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Department of Environment & Climate Change NSW



Statement of Compliance – Licence Details

ALL licence holders must check that the licence details in Section A are correct.

If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.

Licence variation and transfer application forms are available on the EPA website at: <u>http://www.environment.nsw.gov.au/licensing</u>, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

Licence Holder

Licence Number

A1

A2

A4

A5

A6

12883

Licence Holder Trading Name *(if applicable)* ABN JOHNSON PROPERTY GROUP PTY LIMITED

58 102 465 814

Type of Licence

Scheduled Activity - Premises Based

A3 Premises to which Licence Applies

common name (*if any*)Bona VistapremisesBootles Lane, PITT TOWN, NSW

Activities to which Licence Applies

Scheduled Activity Sewage treatment

Other Activities (Not Applicable)

Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure	
Sewage Treatment - processing by small plants (< 10000 ML per year)	> 100 - 219	ML discharged	63

Licence 12883 LIC08/675

Annual Return

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Licence 12883

LIC08/675

JOHNSON PROPERTY GROUP PTY LIMITED



Department of Environment & Climate Change NSW

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED





Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period (as required by condition M4 of the licence).

If no complaints were received enter nil.

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M2 and R1), complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is not required by licence conditions M2 and R1, no tables will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence, (see licence conditions M6 and R1), complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by licence conditions M6 and R1, no tables will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Statement of Compliance – Licence Conditions

C1 Compliance with Licence Conditions

(✓ the boxes)

1 Were all conditions of the licence complied with (including monitoring and reporting requirements)?

(✓ a box)

If you answered 'No' to question 1, please supply the following details for each non-compliance in the format, or similar format, provided on the following page.

Department of Environment & Climate Change NSW

Please use a separate page for each licence condition that has not been complied with.

- a) What was the specific licence condition that was not complied with?
- b) What were the particulars of the non-compliance?
- c) What were the date(s) when the non-compliance occurred, if applicable?
- d) If relevant, what was the precise location where the non-compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

- What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?
-) What was the cause of the non-compliance?
- What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?
- h) What action has been, or will be, taken to prevent a recurrence of the non-compliance?
- 3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section E of this Annual Return

Licence 12883 LIC08/675 Page 6 of 9

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Details of Non-Compliance with Licence

Licence condition number not complied with

Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS)

If required, further details on particulars of non-compliance

Date(s) when the non-compliance occurred, if applicable

If relevant, precise location where the non-compliance occurred (attach a map or diagram)

If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance

Cause of non-compliance

an an an an an

Action taken or that will be taken to mitigate any adverse effects of the non-compliance

Action taken or that will be taken to prevent a recurrence of the non-compliance

Licence 12883 LIC08/675 Page 7 of 9

Department of Environment & Climate Change NSW
Protection of the Environment Operations Act 1997

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Department of Environment & Climate Change NSW



Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are **not** required to monitor assessable pollutants by your licence (see **A7** on this **Annual Return**), **no worksheets** will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

A load-based licensing online fee calculator is available on the EPA's website at www.environment.nsw.gov.au

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

Licence 12883 LIC08/675 Protection of the Environment Operations Act 1997

Annual Return

JOHNSON PROPERTY GROUP PTY LIMITED

Department of	Environment J	Climate	Change	NSW
Department of	Environment c	z chinate	change	11344



Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. Please tick (\checkmark) the box next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:	1.1	the Annual Return must be signed and certified:
an individual	D	by the individual licence holder, or
	D	by a person approved in writing by the EPA to sign on the licence holder's behalf
a company	O	by affixing the common seal in accordance with Corporations Act 2001, or
	0	by 2 directors, or
		by a director and a company secretary, or
	٥	if a proprietary company that has a sole director who is also the sole company secretary – by that director, or
(al la	a	by a person delegated to sign on the company's behalf in accordance with the Corporations Act 2001 and approved in writing by the EPA to sign on the company's behalf.
a public authority		by the Chief Executive Officer of the public authority, or
(other than a council)	٥	by a person delegated to sign on the public authority's behalf in accordance with its legislation and approved in writing by the EPA to sign on the public authority's behalf.
a local council	0	by the General Manager in accordance with s.377 of the Local Government Act 1993, or
2	0	by affixing the seal of the council in a manner authorised under that Act.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.

1/We

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C and D and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates:

For the reporting period 22-May-2008 to 21-May-2009 or ____/____ to

SIGNATURE:	SIGNATURE:	
NAME: (printed)	NAME: (printed)	
POSITION:	POSITION:	
DATE://	DATE://///////_	att

SEAL(if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED

Licence 12883 LIC08/675

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Environment Protection Licence

Licence - 12883

Department of Environment & Climate Change NSW

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Licence Details	the second se
Number:	12883
Anniversary Date:	22-May
Review Due Date:	22-May-2013

Licensee

JOHNSON PROPERTY GROUP PTY LIMITED PO Box A1308 SYDNEY SOUTH NSW 1235

Licence Type

Premises

Premises

Bona Vista Bootles Lane PITT TOWN NSW 2756

Scheduled Activity

Sewage treatment

e Based Activity

Sewage Treatment - processing by small plants (< 10000 ML per year) > 100 - 219 ML discharged

Scale

Region

Metropolitan Level 3, NSW Govt Offices, 84 Crown Street WOLLONGONG NSW 2500 Phone: 02 4224 4100 Fax: 02 4224 4110

PO Box 513 WOLLONGONG EAST NSW 2520

Environment Protection Licence

Licence - 12883



Department of Environment & Climate Change NSW

Environment Protection Licence

Department of Environment & Climate Change NSW

Licence - 12883

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R4	Annual Performance Report	13
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R7	Progress on the Project	13
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GENE	RAL CONDITIONS	14
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Environment Protection Licence

Licence - 12883



Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 132 of the Act); and

report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

143 1

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
 - a load-based fee (if applicable).

The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees.

Environment Protection Authority - NSW

Environment Protection Licence

Licence - 12883

Department of Environment & Climate Change NSW

he licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any onitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
 - licence conditions and variations;
 - statements of compliance;
 - load based licensing information; and
 - load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been be builted to the EPA by licensees.

This licence is issued to:

JOHNSON PROPERTY GROUP PTY LIMITED PO Box A1308 SYDNEY SOUTH NSW 1235

subject to the conditions which follow.

Administrative conditions

What the licence authorises and regulates

Not applicable.

1

A1

A1.1

1.2

This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, feebased activity classification and the scale of the operation.

Environment Protection Licence

Licence - 12883

Department of Environment & Climate Change NSW

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Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity

Sewage treatment

Fee Based Activity Sewage Treatment - processing by small plants (< 10000 ML per year)

> 100 - 219 ML discharged

Scale

Not applicable.

A1.3

12

A2.1

A3

3.1

Premises to which this licence applies

The licence applies to the following premises:

Premises Details	
Bona Vista	
Bootles Lane	
PITT TOWN	
NSW	
2756	
LOT 14 DP 865977	

Other activities

Not applicable.

Environment Protection Authority - NSW

Environment Protection Licence

Licence - 12883



Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

- (a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- (b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Discharges to air and water and applications to land

P1 Location of monitoring/discharge points and areas

P1.1 Not applicable.

P1.2 Not applicable.

P1.3

3

LI

L1.1

L2

L3

L3.1

Not applicable.

Limit conditions

Pollution of waters

Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

Load limits

L2.1 Not applicable.

L2.2 Not applicable.

Concentration limits

Not applicable.

Environment Protection Authority - NSW

Page 7 of 18

Environment Protection Licence

Licence - 12883

3.2

L5

L6

4

02

02.1

03

04

05

Not applicable.

L3.3 Not applicable.

- L4 Volume and mass limits
- L4.1 Not applicable.

Waste

Noise Limits

Operating conditions

Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

Maintenance of plant and equipment

- All plant and equipment installed at the premises or used in connection with the licensed activity:
- (a) must be maintained in a proper and efficient condition; and
- (b), must be operated in a proper and efficient manner.

Sewage Transfer Pipeline

The licensee must ensure that the sewage transfer pipline is planned, designed, constructed and installed to prevent as far as practicable discharge of sewage, partially treated sewage or wastewater from the premises.

Construction Hours

Department of Environment & Climate Change NSW

Environment Protection Licence

Licence - 12883

07

08

Construction activity must be restricted to the following hours:

- 7:00 am to 6:00 pm Monday to Friday;
- 8:00 am to 4:00 pm Saturday; and
- at no time on Sunday or Public Holidays.

Noise Mitigation

The licensee must implement all feasible and reasonable measures to minimise noise and vibration, including but not limited to:

Department of Environment & Climate Change NSW

- (a) using least noisy construction methods, vehicles, plant and equipment;
- (b) positioning and orientating noisy plant and equipment so as to minimise noise impacts on noise sensitive receivers;
- (c) positioning items of noisy plant and equipment as far apart as is practicable from each other;"
- (d) carrying out above ground loading and unloading activities as far away as is practicable from noise sensitive receivers;
- designing each work site to minimise the need for truck reversing movements;
- (f) ensuring all vehicles and self-propelled plant and equipment enter and leave the premises in a forward direction unless unforeseen accidents or other unforeseeable circumstances arise that may require reversing movements, in which case minimising any such reversing movements;
- (g) taking all practicable steps to avoid reversing movements on the surface within the premises, and where it is impracticable to avoid reversing movements, taking all necessary steps to minimise reversing movements;
- (h) avoiding dropping and dragging temporary road plates when putting them in position over unclosed excavations.

The licensee must ensure that where movement alarms are fitted to vehicles, plant or equipment, entering or operating on the premises, such alarms are of a type that minimises noise at noise sensitive receivers

Monitoring and recording conditions

Monitoring records

M1

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
 - (a) in a legible form, or in a form that can readily be reduced to a legible form;
 - (b) kept for at least 4 years after the monitoring or event to which they relate took place; and
 - (c) produced in a legible form to any authorised officer of the EPA who asks to see them.

Section 55 Protection of the Environment Operations Act 1997 Environment Protection Licence Department of Environment & Climate Change NSW Licence - 12883 1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence: the date(s) on which the sample was taken; (a) (b) the time(s) at which the sample was collected; (c) the point at which the sample was taken; and (d) the name of the person who collected the sample. M2 Requirement to monitor concentration of pollutants discharged M2.1 Not applicable. M3 Testing methods - concentration limits M3.1 Not applicable. M3.2 Not applicable. Recording of pollution complaints 4 M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee of agent of the licensee in relation to pollution arising from any activity to which this licence applies. M4.2 The record must include details of the following: (a) the date and time of the complaint: (b) the method by which the complaint was made; (C) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; the nature of the complaint; (d) the action taken by the licensee in relation to the complaint, including any follow-up contact (e) with the complainant; and if no action was taken by the licensee, the reasons why no action was taken. (f) M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made. The record must be produced to any authorised officer of the EPA who asks to see them. M4.4 **Telephone complaints line** M5 15.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

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6

R1.1

R1.2

The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M5.3 Conditions M5.1 and M5.2 do not apply until 3 months after:

- (a) the date of the issue of this licence or
- (b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M6 Requirement to monitor volume or mass

M6.1 Not applicable.

Reporting conditions

R1 Annual return documents

hat documents must an Annual Return contain?

The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

(a) a Statement of Compliance; and

(b) a Monitoring and Complaints Summary.

A copy of the form in which the Annual Return must be supplied to the EPA accompanies this licence. Before the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

Period covered by Annual Return

An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:

- (a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
- (b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

ote: An application to transfer a licence must be made in the approved form for this purpose.

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R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the

Department of Environment & Climate Change NSW.

- reporting period and ending on:
 (a) in relation to the surrender of a licence the date when notice in writing of approval of the surrender is given; or
- (b) in relation to the revocation of the licence the date from which notice revoking the licence operates.

Deadline for Annual Return

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

Notification where actual load can not be calculated

R1.6 Not applicable.

R1.9

R2.1

R2.2

R3

Licensee must retain copy of Annual Return

R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

ertifying of Statement of Compliance and signing of Monitoring and Complaints Summary 1.8 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring

- Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
- (a) the licence holder; or
- (b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R2 Notification of environmental harm

- Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.
 - Notifications must be made by telephoning the EPA's Pollution Line service on 131 555.
 - The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Written report

Environment Protection Licence

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R3.4

R4

R5

Department of Environment & Climate Change NSW

Where an authorised officer of the EPA suspects on reasonable grounds that:

- (a) where this licence applies to premises, an event has occurred at the premises; or
 - (b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,

and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:

- (a) the cause, time and duration of the event;
- (b) the type, volume and concentration of every pollutant discharged as a result of the event;
- (c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
- (d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
- (e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
- details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
- (g) any other relevant matters.

The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

Annual Performance Report

The licensee must supply to the EPA an Annual Performance Report not later than 60 days after the end of each reporting period.

R6

R7

88

The Annual Performance Report is to supplement the Annual Return and must report on, but not necessarily be limited to, the following components:

Progress on the Project

A report on progress during the reporting period towards completion of the project.

Complaints and Reports

A breakdown of the total number of complaints and reports received by the licensee in relation to the premises into categories of "noise", "odours", "water pollution", and any other category indicated by the complaint/report. A brief description of any significant unresolved issues arising out of the complaints and reports must be provided.

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Fauna, Flora and Ecological Communities

A summary of any assessments, environmental management measures, mitigation measures and safeguards undertaken during the reporting period, and on any other relevant matters, in relation to fauna, flora and ecological communities. The summary must include any notifications made, or other actions undertaken, pursuant to the requirements of the National Parks and Wildlife Act 1974 and the Threatened Species Conservation Act 1995. A description of any unresolved issues arising out of the notifications and actions must also be provided.

R10 Aboriginal Cultural Heritage

A summary of any assessments, environmental management measures, mitigation measures and safeguards undertaken during the reporting period, and on any other relevant matters, in relation to Aboriginal cultural heritage. The summary must include any notifications made, or other actions undertaken, pursuant to the requirements of the *National Parks and Wildlife Act 1974.* A description of any unresolved issues arising out of the notifications and actions must also be provided.

The Annual Performance Report must be presented in a format approved in writing by the EPA

General conditions

Copy of licence kept at the premises

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
 - The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2

G3

G4

G1.2

R11

G1

Contact number for incidents and responsible employees

The licensee must operate 24-hour telephone contact lines for the purpose of enabling the EPA to directly contact one or more representatives of the licensee who can:

- (a) respond at all times to incidents relating to the premises; and
- (b) contact the licensee's senior employees or agents authorised at all times to:
 - (i) speak on behalf of the licensee; and
 - (ii) provide any information or document required under this licence.
- The licensee is to inform the EPA in writing of the appointment of any contact persons, or changes to the person's contact details as soon as practicable and in any event within fourteen days of the appointment or change.

Pollution studies and reduction programs

Environment Protection Authority - NSW

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Department of Environment & Climate Change NSW

Not applicable.

Special conditions

E1 Not applicable.

Dictionary

General Dictionary

In this licence, unless the contrary is indicated, the terms below have the following meanings:

		三一下, 经财产性限制
3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples	
Act	Means the Protection of the Environment Operations Act 1997	Senti
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997	1
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998	
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.	- (9)
AMG	Australian Map Grid	
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.	
annual return	Is defined in R1.1	
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998	
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998	
BOD	Means biochemical oxygen demand	
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.	
COD	Means chemical oxygen demand	1
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.	
cond.	Means conductivity	

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ACL

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environment	Has the same meaning as in the Protection of the Environment Operations Act 1997	
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991	
EPA	Means Environment Protection Authority of New South Wales.	
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.	
flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.	
grab sample	Means a single sample taken at a point at a single time	
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997	
Industrial waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997	
inert waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997	
licensee	Means the licence holder described at the front of this licence	
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998	
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997	
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997	
MBAS	Means methylene blue active substances	
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997	
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997	
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997	
O&G	Means oil and grease	an a
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.	
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.	
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997	
premises	Means the premises described in condition A2.1	44.05
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997	
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence	
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary	

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of the date of issue or last renewal of the licence following the commencement of the Act. reprocessing of Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act waste 1997 scheduled activity Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997 solid waste Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997 TM Together with a number, means a test method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales. treatment of waste Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997 TSP Means total suspended particles TSS Means total suspended solids Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or Type 1 substance more of those elements Type 2 substance Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements utilisation area Means any area shown as a utilisation area on a map submitted with the application for this licence Has the same meaning as in the Protection of the Environment Operations Act 1997 waste waste code Means the waste codes listed in Appendix 5 of the EPA document A Guide to Licensing Part B. vaste type Means Group A, Group B, Group C, inert, solid, industrial or hazardous waste

Ms Gillían Reffell

Environment Protection Authority

(By Delegation)

22-May-2008

End Notes

Environment Protection Authority - NSW

Department of Environment & Climate Change NSW



Appendix C Golder Associates Geotechnical Report

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Appendix C Golder Associates Geotechnical Report

Golder Associates Pty Ltd A.B.N. 64 006 107 857

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FACTUAL REPORT ON

GEOTECHNICAL INVESTIGATION PROPOSED PUMPING STATION PITT TOWN, NSW

Submitted to:

Johnson Property Group Pty Ltd Suite 3205, Level 32, Chifley Tower 2 Chifley Square Sydney NSW 2000

DISTRIBUTION:

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August 2007

05623002/020



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Greg Moore	- i -	21 August 2007
Johnson Property Group		05623002/020

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Golder Associates

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Johnson Property Group		05623002/020

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Golder Associates Pty Ltd (Golder) at the site of a pumping station and collection structure to be constructed for the proposed residential development at the Bona Vista and Fernadell land parcels in Pitt Town, NSW (the 'Site'). The current investigation forms a part of ongoing environmental and geotechnical works carried out since 2005 by Golder on behalf of Johnson Property Group (Golder Associates Report ref. 05623002). The Site location and proposed pumping station and collection structure are shown in Figures 1 and 2.

The area of the proposed pumping station and collection structure is about 80 m by 40 m and is located off of Bootles lane, in the south-eastern corner of the 40 hectare Bona Vista land parcel. The Site was previously used for agricultural purposes. The Bona Vista property is located within the jurisdiction of Hawkesbury Council, County of Cumberland and Parish of Pitt Town and is currently zoned as rural land. It is proposed to subdivide the land for development with primarily low-density residential and rural housing, in accordance with draft amendment No. 45 of the Hawkesbury Local Environmental Plan (1989).

The geotechnical investigation was performed in accordance with our proposal (P77622099.A 31st May 2007). The investigation was carried out following approval to proceed from Mr Paul Hedge of Johnson Property Group Pty Ltd (JPG) dated 18th February 2005. This report contains the factual field and laboratory data obtained from the geotechnical investigation.

Our brief was to carry out the geotechnical investigation and provide the field and laboratory test results. Our scope did not include providing geotechnical interpretation or recommendations.

2.0 SCOPE OF WORK

2.1 Fieldwork

The scope of fieldwork for the geotechnical investigation included the drilling of 2 boreholes, BH1 and BH2, using a truck mounted drill rig to depths of 15 m and 12 m, respectively. Boreholes were advanced using solid flight augers fitted with a 'TC'-bit, with Standard penetrometer (SPT) tests performed at 1.5 m intervals. Groundwater inflow observations were made throughout drilling in both boreholes, and water level measurements taken one week following the investigation.

Boreholes were drilled at locations nominated in the Drawing 60023107-GE-004 provided by Maunsell/Aecom, as shown in Figure 2. Borehole locations and levels were surveyed and marked out by a registered surveyor of Rose Atkins Conics Pty Ltd, as a subcontractor to Johnson Property Group, prior to commencement of drilling. Borehole BH1 was located at the position of the proposed wet well, and borehole BH2 at the location of the proposed collection manhole.

The fieldwork was carried out in the presence of a Geotechnical Engineer from our Sydney Office who described the subsurface conditions and collected soil samples. The borehole reports and explanatory notes are presented in Appendix A. The fieldwork was carried out on the 9^{th} August 2007 in accordance with Golder Standard Quality Procedures.

2.2 Geotechnical Laboratory Testing

Five soil samples selected from the two boreholes were submitted to Envirolab Pty Ltd and Golder Associates Laboratory in Adelaide for laboratory analysis. Both laboratories are NATA registered for the tests performed, which included:

- 2 samples for Moisture Content AS 1289 2.1.1;
- 2 samples for Liquid Limit Casagranide methods AS1289.3.1.1 & AS1289.3.1.2;
- 2 samples for Plastic Limit AS1289.3.2.1;
- 2 samples for Plasticity Index AS1289.3.3.1;
- 1 sample for Particle Size Distribution AS 1289.3.6.1 and
- 2 samples for aggressivity Suite including pH, Electrical Conductivity, Soluble Sulphate and chloride.

Laboratory test certificates are presented in Appendix B.

3.0 SITE INFORMATION

3.1 Site Observations

The location of the proposed pumping station and collection structure is an undeveloped wooded area of the Bona Vista land parcel, bordering on an existing residential property to the east. Tall grass and organic debris including large tree branches cover the ground here, which is slightly undulating with no definitive slope direction. Access to the site was through a barbed wire fence bordering on Boodles Lane. The prevailing weather conditions at the time of the investigation were sunny and dry, though it had rained heavily in the previous months.

3.2 Geology and Hydrogeology

The Penrith Sheet 9031 of the 1:100,000 geological maps (SCS NSW, 1991) indicates that the Site is in an area underlain by the Quaternary Pitt Town Sand Formation comprising quartz sand, clay and minor pebbles. Ashfield Shale of the Wianamatta Group is shown on the geological map close to the western boundary of the Site and comprises claystone-siltstone and fine sandstone-siltstone laminates.

The Penrith 1:100,000 Series Soil Landscapes Sheet 9030 (SCS NSW, 1989) indicates that the Site is primarily on the Agnes Bank soil landscape comprising low parallel alluvial / aeolian sand dunes on a flat terrace surface of Tertiary age.







4.0 RESULTS OF THE INVESTIGATION

4.1 Subsurface Conditions

The boreholes indicate that ground conditions in the area of the proposed pumping station are relatively consistent. The soils generally comprise clay with some rootlets and ironstone gravel over gravelly sand with trace of clay (gravelly sand present in BH1 only). Bedrock was not encountered within the depth of investigation (up to 15 m depth).

Borehole	Depth (m, bgl)	Description
	0.0 - 5.50	ALLUVIAL SOIL – Silty CLAY, medium to high plasticity, very stiff to hard
BHI	5.50 - 12.45	ALLUVIAL SOIL – Silty CLAY, high plasticity, stiff to hard
	12.45 - 12.80	ALLUVIAL SOIL – Band of IRONSTONE gravel
	12.80 - 15.00	ALLUVIAL SOIL – Gravelly SAND, medium to coarse grained, trace of clay, medium dense
	0.0-3.00	ALLUVIAL SOIL - Silty CLAY, high plasticity, soft to very stiff
BH2	3.00 - 10.60	ALLUVIAL SOIL - Silty CLAY, high plasticity, very stiff
	10.60 - 12.00	ALLUVIAL SOIL – Silty CLAY, medium to high plasticity, very stiff.

4.2 Geotechnical Laboratory Test Results

Three samples were selected for geotechnical laboratory analysis. The results of the Atterberg limit testing are presented as follows:

Table 2 : Summary of Geotechnical 1	Laboratory	Results
-------------------------------------	------------	---------

Test Location	Depth (m)	Soil Type	Field Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	Particle Size Distribu tion
BH1	1.50- 1.95m	Clay	17.4	52	17	35	N/A-
BH2	3.00 - 3.45m	Clay	14.7	36	13	23	N/A-

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A grain size analysis was also performed on a sample taken from borehole BH1 at a depth of 3 m. The grain size curve indicates a clay soil, and is presented in Appendix B.

Increasing concentrations of sulphates, chlorides, electrical conductivity or low pH create a more aggressive environment for concrete and steel. The results of the aggressivity testing are presented as follows:

Test Location	Depth (m)	Soil Type	pH (pH Units)	Electrical Conductivity (μ S/cm)	Soluble Sulphate (mg/kg)	Chloride (mg/kg)
BHI	4.50- 4.95m	Clay	4.6	960	170	1,200
BH2	0.50- 0.95m	Clay	4.8	640	520	310

Table 3 : Summary of Aggressivity Laboratory Results

The outcome of the pH, chloride and sulphate analyses have been compared with the guidelines for durability presented in Tables 6.1 and 6.3 of AS 2159 *Piling – Design and Installation.* The results indicate that the soil at the Site is likely non-aggressive to mildly aggressive to buried steel and concrete elements.

Laboratory certificates are presented in Appendix B.

4.3 Groundwater Conditions

During the drilling investigation, groundwater inflow was observed at an R.L of 7.85 m AHD in BH1 and at an R.L of 7.68 m AHD in BH2. The water level in BH1 was then taken three hours after drilling to allow for recharge, and it was observed to have risen several metres to an R.L of 10.68 m AHD.

Measurement recorded a week following the investigation indicated groundwater at an R.L of 12.05 m in BHJ and an R.L of 11.88 m in BH2. These readings are inferred to be representative of the equilibrium level in the area, which may fluctuate seasonally and following infiltration events.

5.0 IMPORTANT INFORMATION

Your attention is drawn to the document - "Important Information About Your Geotechnical Engineering Report", which is included in Appendix ? of this report. This document has been prepared by the ASFE (*Professional Firms Practicing in the Geosciences*), of which Golder Associates is a member. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

GOLDER ASSOCIATES PTY LTD

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Jessica McIlveen Geotechnical Engineer

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RMP:JKM/PD: GJF/mp

Phil Davies Senior Geotechnical Engineer



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the information will be ensured and no benefiting on



Appendix A Borehole Reports and Explanatory Notes

	LIEN ROJE DCA DB N	T; ECT FION O;	: 1:	Johns Propo Pitt To 05623	on Property Group sed Pumping Stat wn 002	p ilon		POSITION: Location of Wet Well COORDS: 302101.1 m E 6282382.6 m N 56 M SURFACE RL: 16.25 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 15.50 m	3A94	SHEE I DRILL DRILL LOGG CHEC	T: 1 OF 2 RIG: Hydrapower Scout ER: Macquarie Drilling ED: JKM/RMP DATE: 9/ KED: PD DATE: 21
	7	Dril	ling		Sampling		1	Field Material Desi	ripti	on >	
METHOD	PENETRATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0-	16.20	DS0.00-0.20 m SPT0.50-0.95 m 2,6,10 N = 16		СН	TOPSOIL: Sandy SILT, low plasticity, dark brown CLAY, high plasticity, mottled orange and grey, with some slit lenses and a trace of fine angular gravel, roots	W	AL)	LUVIAL SOIL
			1.0-	0.87			CI CH	Slity CLAY, medium to high plasticity, light grey with orange mottling	1	St-VSt	
			2.0	-	SPT1.50-1.95 m 7,9,17 N = 26	× · · ·	8 - R - IX- IX-			NSI	
			2.5	2,50 13.75	SPT3.00-3.45 m 9,14,18 N ≈ 32	×		As above but with bands of ironstone gravel, red, medium grained, with a trace of fine gravel and sand	D-M		
ADT	Ľ	16/8/07 JN	3.5 4.0 4.5 5.0		SPT4,50-4.95 m 7,13,20 N = 33					H	
			5.5- 6.0- 6.5-	<u>5,50</u> 10.75	SPT6.00-6.45 m 10,14,17 N = 31		CH	CLAY, high plasticity, pale grey with some orange mottling with ~50% zones of Sitty CLAY, medium to high plasticity, red and orange, dry, hard (weathered ironstone)	5	H4S	
			7.0-	7.50	SP17,50-7,95 m 10,15,23 N = 38			Silty CLAY, high plasticity, grey, trace of orange staining	2	SV	



REPORT OF BOREHOLE: BH1

CLIENT: PROJECT: LOCATION: JOB NO: 05623002

Johnson Property Group Proposed Pumping Station Pitt Town

POSITION: Location of Wet Well COORDS: 302101.1 m E 6282382.6 m N 56 MGA94 DRILL RIG: Hydrapower Scout V SURFACE RL: 16.25 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 15.50 m

SHEET: 2 OF 2

DRILLER: Macquarie Drilling LOGGED: JKM/RMP DATE: 9/8/07 CHECKED: PD DATE: 21/8/07

	Drilling Sampling							Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
		lling ∏	8.0	<u>8.40</u> 7.85			*		Silty CLAY, high plasticity, grey, trace of orange staining with zones of fine to medium ironstone gravel ~15%	M W	VSt-H	ALLUVIAL SOIL	
	L	Seepage observed during dr	9.0		SPT9.00-9.45 m 12,13,14 N ≑ 27					M			
	м		10.0	10,80 5.45	SPT10.50-10.95 m 5,7,14 N = 21			CL	Silly CLAY, medium plasticity, with ~50% Silty CLAY, low plasticity, red-brown (extremely weathered ironstone)		St-VSf		
ADT			11.5 	12.00 4.25 12,50 3.75	SPT12.00-12.45 m 5,10,14 N = 24			GP	with zones of fine to medium ironstone gravel ~15%	W-O			
	н		-	12.80 3.45			00	SC	Gravely Clavey SAND, medium to coarse grained		Т	-	
	м		13.0 - - - - - - - - - - - - - - - - - - -	14.00	SPT13.50-13.95 m 9,11,13 N = 24		0 - D - D - D - D	50	orlated clayes SAND, medium to coarse gramed, motified red-orange and brown with a trace of black, clay is medium plasticity, gravel is fine, sub-angular to sub-rounded, clay lenses		VSt		
	н		14.5	2.25	SPT15.00-15.45 m		0 0 0 0		gravel content increasing	M	 E		
DEIN INFA ONF CONTRACTOR			- 15.5 - - - -	<u>15.50</u> 0,75	12,17,30 N = 47		<u>.</u> . <u>p</u>		END OF BOREHOLE @ 15.50 m Reached target depth Boreholes left open for water level monitoring				
	J	L	16:0 ¹	 Thi geote	is report of borehole echnical purposes or for Information only	nu nu nly, and	st be r withou d do no	ead it atto of ne	n conjunction with accompanying notes and abbreviatior mpt to assess possible contamination. Any references cessarily indicate the presence or absence of soil or grou	s. It o pol ndwa	has t tentia ater c	been prepared for I contamination are contamination. GAP gINT FN. F01a RL2	
CL PF LC JC	LIEN ROJ DCA	IT: ECT TIOI IO:	\$\$0 7: N:	Johns Propo Pitt To 05623	on Property Grou sed Pumping Stat own 0002	p tion			POSITION: Location of Manhole COORDS: 302113.9 m E 6282381.7 m N 56 MG SURFACE RL: 16.18 m DATUM: ÅHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 12.45 m	GA9∕	SH 4 DR DR LO CH	IEET: 1 OF 2 RILL RIG: Hydrapower Scout V RILLER: Macquarie Drilling IGGED: JKM/RMP DATE: 9/8/07 IECKED: PD DATE: 21/8/07	
----------------------	--------------------	---------------------------	--------------------------	------------------------------------	---	-----------	----------------	------------	---	----------	------------------------------	---	
		Dri	lling		Sampling				Field Material Desc	ripti	on		
METHOD	PENETRATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0	16,13	D\$0.00- m		×	сн	TOPSOIL: Sandy SILT, low plasticity, dark brown Silty CLAY, blob plasticity, red, grey and brown, with a	1	-	ALLUVIAL SOIL	
			0.5	0.50 15.68	SPT0,50-0.95 m 3,6,10 N = 16	1	×		trace of grey slit, rootlets and organic matter (to 0.5m) some rootlets and roots, no organic matter from 0.5m	W	S-St		
			1.0				×,]	
			1.5-		SPT1.50-1.95 m x 5,9,16 N = 25								
			2.0				^						
	L		2.5-				~			M-O			
			-				×						
			3.0	<u>3.00</u> 13.18	SPT3.00-3.45 m 8,11,15 N = 26		×	СН	Silty CLAY, high plasticity, grey, with up to 50% zones of Silty CLAY, low to medium plasticity, orange-brown, with a trace of ironstone gravel, fine to medium		-		
			3.5				×`		grained, angular				
ADT		¥ ₩0	4.0				×^						
			4.5-		SPT4.50-4.95 m		×,				<u>т</u>	 	
	1		5.0				× 				VSt-		
			5.5				×`			G			
	м		6.0 — -		SPT6,00-6.45 m 8,10,10 N = 20		×	-					
			6.5-				×	0					
			7.0-				×						
			7.5		SPT7.50-7.95 m 10,17,22 N = 39		*`						
			-		10,17,22 N = 39		* 						

REPORT OF BOREHOLE: BH2

CLIENT: PROJECT: LOCATION:

JOB NO:

Johnson Property Group Proposed Pumping Station Pitt Town

05623002

POSITION: Location of Manhole COORDS: 302113.9 m E 6282381.7 m N 56 MGA94 DRILL RIG: Hydrapower Scout V SURFACE RL: 16.18 m DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mmHOLE DEPTH: 12.45 m

SHEET: 2 OF 2 DRILLER: Macquarie Drilling LOGGED: JKM/RMP DATE: 9/8/07 CHECKED: PD DATE: 21/8/07

			Dri	lling		Sampling				Field Material Desc	iptic	on	
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			\sum	8.0				×	СН	Silty CLAY, high plasticity, grey, with up to 50% zones of Silty CLAY, low to medium plasticity, orange-brown, with a trace of ironstone gravel, fine to medium grained, angular			ALLUVIAL SOIL
12:13:15 PM		М		9.0	<u>9.00</u> 7.18	SPT9.00-9.45 m 7,12,16 N = 28				Silty/ Sandy CLAY, as above		H-‡SV	
0-BETA-PH.GDT 21/08/2007	ADT							× × * * *			D		
TION/TPLOGS.GPJ GAP6_I				10.5	10.60 5.58	SPT10.50-10.95 m 4,12,14 N = 26			CI CH	Silty CLAY, high plasticity, as above Silty Sandy CLAY, medium to high plasticity, red-brown mottling, with some zones of low to medium plasticity, and a trace of fine angular ironstone gravel		EN.	
TEL TOWN PUMPING STA		L		11.5 - - 12.0		SPT12.00-12.45 m 6.8.12 N = 20						H-153	
dwsN				-	12 45			<u>x.</u>					-
NMOT TTIE - NOSNHOL				12.5	3,73					END OF BOREHOLE @ 12.45 m Reached target depth Boreholes left open for water level monitoring			
-NVIR0405623002				- 13.5 — - -									
105PR0J001-050V				14.0									
GLB FULL PAGE J				14.5 - - 15.0	-								· · · · · · · · · · · · · · · · · · ·
3ETA_NEW ONE_30.1.07				- - 15.5									
GAPD_U-E				16.0 —	I Thi geote	s report of borehole r achnical purposes on for information only a	nus ly, v and	st be n withou I do no	ead it att ot ne	I	s. It pot ndwa	has t entia ater o	been prepared for I contamination are ontamination. GAP gINT FN. F01a RL2

	Golde	r Mes	ΕX	(PLA	NATION C	F NOTE: BOREH	S, AB OLE A	BRE	VIATIONS & TERMS TEST PIT REPORTS
DRILLI	NG/EXCAVA	TION ME	THOD						
AS*	Auger Screv	wing		RD	Rotary blade o	r drag bit	ŀ	HQ	Diamond Core - 63 mm
AD*	Auger Drillir	ng		RT	Rotary Tricone	bit	1	NMLC	Diamond Core - 52 mm
*V	V-Bit			RAB	Rotary Air Blas	st	1	NQ	Diamond Core - 47 mm
*T	TC-Bit, e.g.	ADT		RC	Reverse Circu	lation	- E	ЗH	Tractor Mounted Backhoe
HA	Hand Auger	r		PT	Push Tube		E	ΞX	Tracked Hydraulic Excavator
DTC	Diatube Cor	ring		CT	Cable Tool Rig)	E	ΞE	Existing Excavation
WB	Washbore of	or Bailer		JET	Jetting		ŀ	HAND	Excavated by Hand Methods
PENET	RATION/EXC	CAVATIO	N RES	ISTANC	E				
L	Low resista	ance. Ra	pid pen	etration	possible with lit	tle effort from	the equi	ipment	used.
М	Medium res	sistance.	. Exca	ation/p	ossible at an acc	eptable rate	with mod	lerate e	ffort from the equipment used.
Н	High resist significant e	ance to p effort from	penetrat the eq	tion/exc uipmen	avation. Furthei t.	penetration i	s possib	le at a s	slow rate and requires
R	Refusal or the digging	Practica impleme	l Refus	al. No achine.	further progress	possible with	out the r	isk of d	amage or unacceptable wear to
These a of exca	assessments vation or drilli	are subje ng tools,	ective and the	nd are o experi	lependent on ma ence of the oper	any factors in ator.	cluding t	he equi	pment power, weight, condition
WATER	2								
2	Z Wa	ter level a	at date	shown		\triangleleft	Partial w	ater los	SS
	> Wa	ter inflow	1				Complet	te water	loss
GROUN	IDWATER N	ОТ	The ot water,	servatio surface	on of groundwat seepage or cav	er, whether p e in of the bo	oresent o rehole/te	or not, v st pit.	was not possible due to drilling
GROUN ENCOU	DWATER N	OT	The bo presen been le	orehole/ it in less eft open	test pit was dry permeable stra for a longer per	/ soon after ta. Inflow ma iod.	excavati ly have b	ion. H been ob	owever, groundwater could be served had the borehole/test pit
SAMPL	ING AND TE	STING							
SPT		Standard	d Penet	ration T	est to AS1289.6	.3.1-1993			
4,7,11	N=18	4,7,11 =	Blows	per 150	mm. N = Blow	s per 300mm	penetra	tion foll	owing 150mm seating
30/80m	m	Where p	ractical	refusal	occurs, the blow	vs and penetr	ation for	that int	erval are reported
HW		Penetral	tion occ	urred u	nder the hamme	r and rod wei	aht only		
НВ		Hammer	- double	e bounci	ing on anvil		g		
DS		Disturbe	d samp	le					
BDS		Bulk dist	urbed s	sample					
W		Water S	npie ample						
FP		Field pe	rmeabil	ity test o	over section note	ed			
FV		Field val	ne shea	r test e:	xpressed as und	orrected shea	ar streng	th (s _v =	peak value, sr = residual value)
PM		Pressure	emeter	test ove	r section noted				
PP		Pocket p	enetro	meter te	st expressed as	instrument re	eading in	i kPa	
063		i hin wal	ied tube	e sampl	e - number Indic	ates nominal	sample	alamete	er in millimetres
R =	g or visually	upserva isible evid	able Co dence r	ontamin of contai	ation and Odou	$\frac{1}{R} = \Delta$	Soll con	n-natur	uon assessment projects)
R =	1 Sligh	t evidend	e of vis	ible cor	ntamination	R = B	Slight	non-na	tural odours identified
R =	2 Visib	le contar	nination	1 	tion	R=C	Moder	rate nor	n-natural odours identified
		MEDY		itamina	lion	K=D	1 Strong	j non-ni	atural odours identified
TOD -	JOKE RECO	VERY	92.3	00	D - Colid Core	Doonucru /0/)		000	- Rook Quality Designation (9/)
1 GR -	Total Core R	ecovery (/0)	- 50		necovery (%)	1	KUD :	- Nook Quality Designation (%)
= Leng	th of core reco	vered up × 10	0 :	<u>Len</u>	gth of cylindrical c	ore recovered	×100	<u>_</u> <u>Σ</u> Α	xial lengths of core > 100 mm Length of core sum
20	ingin or obient				Lengin of core	iun ·			Lengin or core run

Golder	METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS
FILL	CLAY (CL, CI or CH)
。 ⁸ ひっし ⁹ ひっし っこの ⁹ ひっし ⁹ ひっし	ビュンタ 2 立立 3
SAND (SP or SW)	
SILT (ML or MH)	
Combinations of these basic symbols may	be used to indicate mixed materials such as sandy clay.
CLASSIFICATION AND INFERRED Soll and Rock is classified and describe	STRATIGRAPHY In Reports of Boreholes and Test Pits using the preferred method given in



MOISTURE CONDITION

Symbol D Μ W

Description Term Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery. Dry Moist Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere. Soils exude free water. Sands and gravels tend to cohere. Wet

AS1726 - 1993

CONSISTENCY AND DENSITY

CONSIST	ENCY AND DE	NSITY	AS17	AS1726 - 1993					
Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index %	SPT "N" #			
VS	Very Soft	0 to 12 kPa	VL.	Very Loose	Less than 15	0 to 4			
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10			
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30			
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50			
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50			
Н	Hard	Above 200 kPa		-					

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

SPT correlations are not stated in AS1726 - 1993, and may be subject to corrections for overburden pressure and equipment type.



TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

0 menorm			
Symbol	Term	Point Load Index, Is ₍₅₀₎ (MPa)	Field Guide
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
М	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
Н	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
ĒΉ	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK STRENGTH TEST RESULTS

▼

S

V

Schistocity

Vein

- Point Load Strength Index, I_s(50), Axial test (MPa)
- Point Load Strength Index, I_s(50), Diametral test (MPa)

Relationship between I_s(50) and UCS (unconfined compressive strength) will vary with rock type and strength, and should be determined on a site-specific basis. UCS is typically 10 to 30 x I_s(50), but can be as low as 5.

ROCK M	ATERIAL W	EATHERING							
Symbol Term				Field Guide					
F	RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.						
E	W	Extremely Weathered	Rock disint	is weathered to such an e regrates or can be remould	ent that it has soll properties - i.e. it either in water.				
	HW		Rock disco	strength usually changed loured, usually by iron	by weathering. The rock may be high staining. Porosity may be increased b				
DW	MW	Distinctly Weathered	leach pores Weat typica	leaching, or may be decreased due to deposition of weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.					
s	W	Slightly Weathered	Rock is slightly discoloured but shows little or no change of strength relative to fresh rock.						
F	R	Fresh	Rock shows no sign of decomposition or staining.						
ABBREV	ATIONS FO	R DEFECT TYPES	AND DES	CRIPTIONS	· · · · · · · · · · · · · · · · · · ·				
Defect Type B Bedding parting X Foliation C Contact L Cleavage		Coating Cn Sn Vr Ct	g or Infilling Clean Stain Veneer Coating or Infill	Roughness SI Slickensided Sm Smooth Ro Rough					
J SS/SZ CS/CZ DS/DZ IS/IZ	Joint Sheared Crushed Decompo Infilled se	seam/zone (Fault) seam/zone (Fault) sed seam/zone am/zone	Planarit Pl Un St	ty Planar Undulating Stepped	Vertical Boreholes – The dip (inclination from horizontal) of the defect is given. Inclined Boreholes – The inclination				

measured as the acute angle to the

core axis.

Appendix B Laboratory Test Certificates

Golder Associates Pty Ltd 199 Franklin Street, Adelaide SA 5000

Atterberg Limits Test Report

Client:	Johnson Property Group,	······································	J	ob No.:	05623002	······
	C/- Brown Consulting, PO Bo	x 6745, Bla	acktown, N	ISW , 2148		
Project:	Pitt Town - Pumping Station		R	eport No.:	05623002	/ R1
Location:	Bootles Lane, Pitt Town		D	ate:	17 August	2007
Test Procedu	ure: AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1					
Sample No.	Sample			Atterbeirg Lir	nits	
	and Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkagé (%)	Moisture Content (%) *
GA 9791	BH1 – 1.50 – 1.95m (CH) CLAY, high plasticity, brown.	52	17	35	10.5	17.4
GA 9793	BH2 – 3.00 – 3.45m (Cł) CLAY, medium plasticity, brown.	36	13	23	8.0	14.7
						· · · · · ·
Note:						
Sample Histor	Y : Air Dried					
Method of Prep	paration : Dry Sieved	•				
Size of Mould	: 250mm					
N,D, = not diete	ermined					
N.O. = not obta	ainable					
N.P. = non plas	stic					

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Approved Signatory:

Darren Shotton Laboratory Manager



Form AD1042.doc 121006

Golder Associates Pty Ltd 199 Franklin Street, Adelaide SA 5000



Approved Signatory, Darren Shotton - Laboratory Manager



Envirolab Services Pty Ltd

ABN 37 112 535 645 54 Frenchs Rd Willoughby NSW 2068 ph 02 9958 5801 fax 02 9958 5803 email: tnotaras@envirolabservices.com.au

CERTIFICATE OF ANALYSIS 13012

Client:

Golder Associates 88 Chandos St St Leonards NSW 2065

Attention: Jessica McIlveen

Sample log in details:

Your Reference: No. of samples: Date samples received: Date completed instructions received: 05623002, Pitt Town 2 Soils 10/08/07 10/08/07

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 15/08/07 Date of Preliminary Report: Not Issued Issue Date: 14/08/07 NATA accreditation number 2901. This document shall not be reproduced except in full. This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Results Approved By:

Jacinta/Hurst

Operations Manager

Envirolab Reference: 13012 Revision No: R 00



Page 1 of 5

Client Reference: 05623002, Pitt Town

Miscellaneous Inorg - soil Our Reference: Your Reference Depth Type of sample	UNITS	13012-1 BH1 4.50m Soll	13012-2 BH2 0.50m Soll
pH 1:5 soll:water	pH Units	4.6	4.8
Electrical Conductivity 1:5 soil:water	µ\$/cm	960	640
Sulphate, SO4 1:5 soil:water	mg/kg	170	520
Chloride 1:5 soil:water	mg/kg	1,200	310



Envirolab Reference: 13012 Revision No: R 00



Page 2 of 5

Client Reference: 05623002, Pitt Town

Method ID	Methodology Summary
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
LAB.2	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA2510 20th ED and Rayment & Higginson.
LAB.9	Sulphate determined turbidimetrically.
LAB.11	Chloride determined by argentometric titration.

Envirolab Reference: 13012 Revision No: R 00



Page 3 of 5

Client Reference: 05623002, Pitt Town

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorg - soli	-					Base II Duplicate II %RPD		
pH 1:5 soil:water	pH Units		LAB.1	[NT]	13012-1	4.6 [N/T]	LCS-1	101%
Electrical Conductivity 1:5 soil:water	µS/cm	1	LAB.2	<1.0	13012-1	960 950 RPD: 1	LCS-1	105%
Sulphate, SO4 1:5 soil:water	mg/kg	25	LAB.9	<25	13012-1	170 [N/T]	LCS-1	112%
Chloride 1:5 soil:water	mg/kg	100	LAB.11	<100	13012-1	1200 [N/T]	LCS-1	100%

Envirolab Reference: 13012 Revision No: R 00



Page 4 of 5

Report Comments:

Asbestos analysed by: Not applicable for this job

INS: Insufficient sample for this test RPD: Relative Percent Difference NR: Not requested NT: Not tested NA: Test not required <: Less than PQL: Practical Quanitation Limit LCS: Laboratory Control Sample >: Greater than

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate**: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. **LCS (Laboratory Control Sample)**: This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of Interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria:

Duplicates: <5xPQL - any RPD is acceptable;</th>>5xPQL - 0-50% RPD is acceptable.Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for
SVOC and speciated phenols is acceptable.Surrogates: Generally 60-140% is acceptable.

Envirolab Reference: 13012 Revision No: R 00



Page 5 of 5

Appendix C Important Information about your Geotechnical Engineering Report

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfil the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. And no one – not even you – should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include : the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was :

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical change that can erode the reliability of an existing geotechnical engineering report include those that affect :

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *Geotechnical Engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by : the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalise their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation*.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognise that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available

to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognise that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labelled "limitations", many of these provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognise their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE member geotechnical engineer for more information.



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Appendix D Flora and Fauna Report





Proposed Pump Station and Rising Main

Flora and Fauna Assessment Report

Johnson Property Group 09 July 2008

Proposed Pump Station and Rising Main

Prepared for

Johnson Property Group

Prepared by

Maunsell Australia Pty Ltd

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Executive Summary

This Flora and Fauna Assessment Report has been prepared to assess the construction and operation of a sewage pumping station and sewer main at Pitt Town. The location of this sewerage infrastructure is constrained by a number of factors including land ownership, landscape characteristics and potential conflicts with existing and proposed infrastructure. Potential environmental impacts, including flora and fauna impacts, also represent a constraint to design.

Three threatened species, the endangered Cumberland Land Snail *Meridolum corneovirens* and the vulnerable plants Downy Wattle *Acacia pubescens* and *Dillwynia tenuifolia* were detected on or close to the proposed route of the sewerage mains during site investigations. One threatened ecological community, *Shale Gravel Transition Forest*, would be affected by the proposed action.

Consultation between the proponent, Maunsell ecologists, heritage consultants, relevant NSW government agencies and the Hawkesbury City Council representatives has been conducted in order to minimise the potential impact on flora and fauna whilst considering other important constraints.

The resulting design and construction methodology, together with the implementation of the mitigation measure contained herein is considered sufficient to mitigate impacts on flora and fauna such that a significant adverse impact is unlikely to result.

1.0 Background to the Study

Johnson Property Group (the proponent) is developing a new residential area at Pitt Town approximately 60 km north-west of Sydney (Figure 1). This Flora and Fauna Assessment Report has been prepared as part of a Review of Environmental Factors (REF) (Maunsell 2008) seeking approval from Hawkesbury City Council, as determining authority, under Part 5 of the *Environment Planning and Assessment Act* 1979 (EP&A Act) for the construction and operation of a sewage pumping station and sewer main to serve future development at Pitt Town.



Figure 1 Locality map of Pitt Town

Source - Lands 2007

1.1 **Objectives of the Flora and Flora Assessment**

The objectives of the assessment are to:

- Determine if any species, population or ecological community would be significantly affected by the proposal,
- Recommend measures to minimise impacts on flora and fauna,
- Recommend measures to offset residual impact on flora and fauna, and
- Recommend any additional assessment that may be required.

1.2 Legislative Requirements

The EP&A Act and EP&A Regulation provide the statutory context for assessment of the proposed sewerage pump station and rising main. The proposal is to be assessed under the provisions of Part 5 of the EP&A Act with Johnson Property Group the proponent and Hawkesbury City Council the consent authority.

The EP&A Act is supplemented by a number of Environmental Planning Instrument's (EPIs) including:

- State Environmental Planning Policies (SEPPs)
- Regional Environmental Plans (REPs)
- Local Environmental Plans (LEPs)
- Other planning policies and guidance statements.

Relevant legislation that applies to the proposed sewerage works is described in the following sections.

1.3 NSW Legislation

1.3.1 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) outlines the protection of threatened species, communities and critical habitat in NSW. The Act is administered by the Department of Environment and Climate Change (DECC). Section 91 of the TSC Act requires that a license be obtained should a development result in one or more of the following:

- Harm to any animal that is of, or is part of, a threatened species, population or ecological community
- The picking of any plant that is of, or is part of, a threatened species, population or ecological community
- Damage to critical habitat
- Damage to habitat of a threatened species, population or ecological community.

In accordance with section 5A of the EP&A Act, a Seven Part Test would be undertaken to determine the significance of the effect on a particular species or EEC. Should this determine that the project would result in a significant impact on the threatened species, population or EEC then a Species Impact Statement (SIS) would be required. Concurrence would be required from the Director General of the Department of Environment and Climate Change. Accordingly, a copy of the REF and associated assessments under the NSW TSC Act will be forwarded to the DECC.

Based on the outcome of Seven Part Tests, the current project has the potential to impact upon EEC's listed under Schedule 1 of the TSC Act but the impact is not likely to be significant and a SIS is therefore not required.

1.3.2 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) regulates the clearing of all native vegetation on land in NSW except land listed under Schedule 1 of the Act. Excluded land includes land in the local government area of Hawkesbury in the urban area of Sydney. Since the project falls within this local government area, the NV Act does not apply.

1.3.3 National Parks and Wildlife Act 1974

The purpose of this the *National Parks and Wildlife Act 1974* (NPW Act) is to provide the primary basis for protection and unwarranted destruction of relics of high cultural significance – both Indigenous and non-Indigenous value. In addition, the NPW Act also provides a framework to conserve native

terrestrial flora and fauna species and manage areas of conservation value such as Nature Reserves, which includes:

- a Section 87(1) permit may be required to conduct preliminary research or excavate any potential archaeological deposits and relics located along the works corridor
- a Section 90(2) Permit (i.e. consent to destroy) may be required to disturb, destroy, deface or damage any relic, sites or Aboriginal Places
- it is an offence to harm, trade, possess or damage critical habitat or the habitat of any threatened species without obtaining a Section 120 licence.

DECC also provides guidelines for standard archaeological reporting and assessment (NPWS 1997). These guidelines are currently being updated and are in draft form (NPWS 2003).

The NPW Act requires that a permit from the Director General be obtained before archaeological fieldwork involving disturbance to an Aboriginal site is carried out. Queries and applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork, should be directed to the Cultural Heritage Unit Manager at the relevant DECC Aboriginal Heritage Division regional Office.

1.3.4 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides a framework of protection for the extraction of water and structural change to existing watercourses. More specifically, the Water Management Act 2000 provides that certain types of development and activities that are carried out in or near a river, lake or estuary are controlled activities. A controlled activity includes the following:

- the erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or
- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or
- the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

Section 344(1)(a) requires that a person must not carry out a controlled activity in, or under waterfront land otherwise than in accordance with a controlled activity approval (CAA). The proposed rising main works are within 40 m of Hortons and Mckenzies watercourses and therefore require a CAA under the WM Act.

On 4 February 2008 an application was made to the Department of Water and Energy to obtain a Controlled Activity Approval (CAA) issued under '*Part 3 – Approvals*' of the WM Act. On 7 March 2008 the CAA was issued by Department of Water and Energy (refer Appendix D of REF for details). The CAA permits the proponent to undertake works for a sewer main on waterfront land for McKenzies, Horton Creeks and tributary of Hawkesbury River- Pitt Town and McGraths Hill, NSW. The CAA is issued for a period of five years and expires on 7 March 2013. Conditions in the CAA are listed in Appendix D of the REF and should be incorporated during project execution.

1.3.5 Fisheries Management Act 1994

The *Fisheries Management Act 1994* and *Fisheries Management Amendment Act 1997* provide for the conservation, protection and management of fisheries, aquatic systems and habitats in NSW. Permits are required for any dredging or reclamation works, any harm to marine vegetation or any obstruction to fish passage. The proposal will not affect aquatic ecosystems and no permits are required under either of these Acts.

1.4 Commonwealth Legislation

1.4.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) governs the Commonwealth Environmental Assessment process and provides protection for matters of National Environmental Significance (NES), which include:

- Nationally threatened species and ecological communities
- Australia's World heritage properties
- Ramsar wetlands of international importance
- Migratory species listed under the EPBC Act (species protected under international agreements)
- Commonwealth marine areas
- Nuclear actions, including uranium mining
- National heritage.

The EPBC Act is separate from other approvals (such as those under the *Threatened Species Conservation Act 1995*).

Given the outcomes of the ecological investigations conducted as part of this REF, together with consideration of the above guidelines, it is unlikely that there will be a significant impact to communities listed under the EPBC Act and therefore a referral to Department of Environment, Water, Heritage and the Arts (DEWHA) for information is not required.

1.5 Topography, Geology and Soils

Pitt Town is in a semi-rural area characterised by farming land. The study area lies to the north of the town centre. The surrounding landscape slopes gently away from the site towards the east and south. The topography of this site for the proposed pump station is relatively flat, with the site grade falling gently in a north-west to south-east direction. This area comprises of vegetated bushland. The topography of the route of the proposed rising main is also relatively flat, with a slight grade falling in a south-west direction.

The 1:50,000 geology map for Windsor indicates that the site locality is underlain by Tertiary deposits with a verity of materials including sand and loam, clay, claystone and sandstone, conglomerate, laterite, and lateritised gravel.

A geotechnical investigation has been carried out by Golder Associates and a report issued; Geotechnical Investigation Proposed Residential Development Pitt Town, NSW (RCA document Number 05623002/12) dated June 2005. Appendix D of the REF discusses the geotechnical investigation of the site in relation to the proposed works. Based on the information available, it can be deduced that:

- Ground condition is relatively consistent across the study site.
- Soils generally compromise of sand and clay mixtures.
- Bedrock was not encountered with the depth of investigation.
- The eastern half of the site the profile is predominantly clay with a variable surficial layer of silt and sand.
- Seepage was encountered to a depth of 0.7m 2 m in several of the test pits.
- The site of the proposed works would not be located in an area subject to landslip.

There are no known acid sulfate soils on the site. If a change to the scope of works is required and the potential for acid sulfate soils or contamination arises, a management plan will be developed to ensure compliance with DECC requirements.

2.0 Methodology

2.1 Study Area

The site and surrounds of the proposed pump station and the entire rising main route (see Appendix A of the REF) was visually inspected. Visual inspection was used to determine which areas required detailed investigation of flora and fauna.

Much of the route of the proposed sewerage main is within existing road reserves and cleared land and works in these areas are considered unlikely to cause significant impacts on flora and fauna. The initial inspection showed that other areas potentially affected by the proposal contain native vegetation and fauna habitat. These areas were designated as the study area for further ecological studies. The ecology study area is shown in **Figure 2**.

2.2 Desktop investigation

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened flora or fauna species listed under the TSC Act or EPBC Act have been recorded or predicted to occur within a 10km radius of the ecology study area.

The DECC threatened species profile of each of these species was reviewed in order to determine which of these species have the potential to occur on the site on the basis of the habitat characteristics present.

2.3 Seasonal and Weather Conditions

Three site visits were conducted for the flora and fauna survey. The weather condition on these days is described in **Table 1** below.

Date	Approximate temperature range	Wind	Weather
29 March 2007	24-27	Light	Fine
24 April 2007	18-22	Moderate	Light rain
3 April 2008.	26-29	Light	Fine

Table 1 Seasonal and weather conditions

This range of conditions during the field survey is considered to be conducive to the detection of the flora and fauna species targeted.

2.4 Staff undertaking survey and assessment

Field surveys were undertaken by Paul Rossington. Assistance with desktop investigations, impact assessment and peer review was provided by Dr Gillian Eckert.

Paul Rossington has completed a Bachelor of Science Degree, majoring in botany, zoology and ecology and a Post-graduate Diploma of Wildlife Management. Paul holds a current DECC Scientific License for flora and fauna studies.

Gillian holds a Bachelor of Science (Hons) in zoology and a PhD in marine ecology.

2.5 Flora Survey Methodology

2.5.1 Flora and vegetation communities

Three site visits were conducted to assess the likely impact of the proposed action on the flora of the locality. This involved the investigation of the structure, condition and composition of vegetation communities present and a targeted search for threatened flora species in the sections of the proposed rising main route which pass through areas of native vegetation and the site of the pump station. The distribution of vegetation communities shown in existing mapping (NPWS 2002) was ground truthed

Plant species were identified with reference to the Harden (2007).

A total of 10 person hours was spent on flora surveys as per Table 2 below.

Survey Unit	Number of Units	Duration (hours per unit)	Total Effort (hours)
Flora Quadrat (400 sq.m)	2	2.5	5
Targeted Search for Threatened Flora	4	0.75	3
Condition Assessment	4	0.5	2
Total Effort	-	-	10

Table 2 Flora and Vegetation Survey Effort

2.6 Fauna Survey Methodology

Given the limited extent of habitat available on the site and the extent of the proposed activities, a detailed field survey of fauna species was considered unnecessary.

Three site visits were conducted, however to assess habitat attributes, survey diurnal birds and reptiles, search for signs of animal activity and to conduct targeted searches for the Cumberland Land Snail *Meridolum corneovirens*. Diurnal bird censuses were conducted on separate days in the vicinity of the pump station and rising main.

Three habitat searches for the Cumberland Land Snail, of six person hours total duration, were conducted in the precise location of the pump station, in the adjacent SGTF remnant, and in potential habitat along the route of the rising main between Bootles Lane and Cattai Road and between Old Pitt Town Road and Hortons Creek.

A conservative approach was taken in the assessment of the likelihood of occurrence of threatened fauna species in order to account for the limited extent of field survey undertaken.

A total of 12 person hours was spent on fauna surveys as per Table 3 below.

Survey Unit	Number of Units	Duration (hours per unit)	Total Effort (hours)
Fauna Habitat Assessment	4	0.5	2
Targeted Search for Cumberland Land Snail	3	2	6
Tracks, Scats and Signs Search	4	0.5	2
Diurnal Bird Survey	4	0.5	2
Total Effort	-	-	12

Table 3 Fauna Survey Effort

3.0 Flora Results

3.1 Vegetation of the Study Area

The vegetation communities and the location of threatened flora and fauna are shown in **Figure 2**. This figure is based on site investigations and NPWS (2002) vegetation mapping.





Much of the route of the proposed rising main is within existing road reserves and cleared land. The section of the proposed rising main that has potential to cause direct impacts to native vegetation and fauna habitat is shown in Figure 2 and assessed below.

The site of the proposed pump station and access road is adjacent to a remnant of Shale Gravel Transition Forest in the Sydney Basin Bioregion (SGTF), an Endangered Ecological Community (EEC) under the TSC Act. This community is not listed under the EPBC Act. The area that would be occupied by the pump station and access road has previously been cleared and is dominated by exotic vegetation including Kikuyu Grass *Pennisteum clandestinum* and *Bidens pilosa* though some native groundcover species including *Juncus usitatus, Oplismenus aemulus* and *Eriochloa pseudoacrotricha* and a few isolated trees remain (Figure 3)

Scattered individuals of *Eucalyptus* spp. and *Melaleuca decora* also occur here. The adjacent wooded area to the north and east contains relatively intact SGTF. There is evidence of previous partial clearing and regrowth of this woodland. Approximately ten individuals of *A. pubescens* occur in this remnant. *A. pubescens* has a suckering habit and thus this count is based on the number of distinct clumps (1-4 m in width with 1-20+ stems) rather than the number of stems The precise number of genetic individuals is hence unknown. This area would not be directly affected by the proposed works.

Figure 3 Vegetation cover at the site of the proposed pump station



The unformed section of Bootles Lane between the existing sealed section of Bootles Lane and Cattai Road contains SGTF. This section of the route consists of a previously cleared and disturbed middle strip (dirt track in northern half) approximately 4m in width with strips of vegetation on each side. Each strip of vegetation is approximately 8m in width. The vegetation here varies in condition and is a mix of native and exotic species though most of its extent remains recognisable as SGTF. The highly disturbed middle strip contains areas of bare soil, patches of exotic grasses and forbs and piles of logs and rubbish and would not be considered to be SGTF in its current form. The canopy is dominated by Red Ironbark *Eucalyptus fibrosa* and Grey Box *Eucalyptus molucanna*. Two clumps of Downy Wattle *Acacia pubescens*, listed as Vulnerable under both the TSC Act and the EPBC Act, are present on the south-western side of the middle strip, in the northern half of this section (See Figure 2).

The road reserve on the north-western side of Cattai Road, from Buckingham Street for approximately 70m north-east contains disturbed SGTF. This section of SGTF would not be affected by the proposed works as the rising main would be constructed on the south-eastern side of Cattai Rd.

The road reserve on the south-eastern side of Cattai Road is dominated by exotic grasses including *Eragrostis curvula* and is largely free of native vegetation with the exception of a discontinuous canopy of *Eucalyptus* species.

Several specimens (8 stems) of *Acacia pubescens* occur in a small patch of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43.

The section of the rising main route between Cattai Road and Old Pitt Town Road traverses a partially cleared parcel of land. This area contains scattered trees but has minimal understorey vegetation. No shrub species are apparent here though small eucalypts (less than 1m) are scattered throughout the groundcover layer. The lack of shrubs and larger eucalypt regrowth is likely as a result of regular mowing or grazing. The ground layer here consists primarily of a mix of native and exotic grasses and

forbs. No threatened plant species were recorded here and given the previous and ongoing disturbance to this vegetation, none are considered likely to occur. Despite being highly disturbed, this vegetation is considered to conform to the description of SGTF.

The route of the rising main continues south of Old Pitt Town Road where it passes through a patch of disturbed SGTF before crossing Hortons Creek, a tributary of Pitt Town Lagoon. This patch of SGTF contains approximately 25-30 individuals of *Dillwynia tenuifolia* which is listed as a Vulnerable species under both the TSC and EPBC acts.

After crossing Old Pitt Town Road, the route continues along the southern side of the road for approximately 50 metres to the west, crossing Hortons Creek, a tributary of Pitt Town Lagoon. The route avoids the nearby patch of SGTF which contains approximately 25-30 individuals of *Dillwynia tenuifolia* which is listed as a Vulnerable species under both the TSC and EPBC acts.

Where the rising main crosses Hortons Creek it passes through a small patch of degraded riparian vegetation consisting primarily exotic plant species including kikuyu grass *Pennisetum clandestinum*, blackberry *Rubus fruticosus species complex*, morning glory *Ipomoea indica*, with cumbungi *Typha orientalis* the only abundant native species. Noxious aquatic weed species (e.g. Alligator Weed *Alternanthera philoxeroides*) are known to occur in the region. No noxious aquatic weeds were found at the location of the creek crossing and hence the likelihood that the proposed works would contribute to the spread of these species is considered to be low. Other creek crossings are within cleared and disturbed environments and would be under-bored. With the implementation of the mitigation measures described herein significant impacts on riparian vegetation in these areas is unlikely.



Figure 4 Vegetation within the unformed section of Bootles lane (facing south)

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any additional threatened plant species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there are a number threatened species recorded in the vicinity of the site. The likelihood of occurrence of these species based on previous records and habitat attributes is summarised in **Appendix D**. Those species which were considered to have a moderate to high likelihood of occurring on the site on the basis of distribution and habitat requirements are shown in **Table 4** below.

Table 4 Threatened flora with potential to occur in study area

Species Name	Status	Likelihood of Occurrence	Database / Act
Acacia pubescens Downy Wattle	Vulnerable	Recorded on site	EPBC, TSC
Dillwynia tenuifolia	Vulnerable	Recorded on site	EPBC, TSC
Grevillea juniperina subsp. juniperina Juniper-leaved Grevillea	Vulnerable	Moderate	TSC
Pimelea spicata Spiked Rice-flower	Endangered	Moderate	EPBC, TSC
Pultenaea parviflora	Vulnerable (EPBC) Endangered (TSC)	Moderate	EPBC, TSC
Persoonia nutans Nodding Geebung	Endangered	Moderate	EPBC, TSC
Reference: DECC 2008			

4.0 Fauna Results

4.1 Fauna Habitats and Corridors of the Study Area

Searches of the NPWS Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool were conducted to determine if any threatened fauna species listed under the TSC Act or EPBC Act are likely to occur in the vicinity. The database revealed that there were a number threatened species recorded in the vicinity of the site. The likelihood of occurrence in the ecology study area of these species based on previous records and habitat attributes is summarised in **Appendix D**. The species which are considered to have a moderate to high likelihood of utilising the habitats of the ecology study area are shown in Table 5.

One threatened fauna species, the Cumberland Land Snail *Meridolum corneovirens* was recorded in the ecology study area during the visits. This species was recorded in the patch of SGTF within the ecology study area south of Old Pitt Town Road. This species was not recorded elsewhere in the ecology study area during targeted searches. The fauna species recorded during the site visit are shown in **Appendix A**.

Habitat for a variety of fauna species exists within the remnant SGTF areas occurring within the study site as described below.

Eucalypts, (*Eucalyptus* spp.), Wattles (*Acacia* spp.) and Paperbarks (*Melaleuca* spp.) provide a food source in the form of leaves, sap, nectar, pollen and seed for a number of bird, mammal and insect species. Threatened species with a moderate to high likelihood of using this resource include *Pteropus poliocephalus* (Grey-headed Flying-fox), *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Melithreptus gularis* (Black-chinned Honeyeater), *Phascolarctos cinereus* (Koala) and *Petaurus australis* (Yellow-bellied Glider). The migratory nectar-feeding birds *Lathamus discolor* (Swift Parrot) and *Xanthomyza phrygia* (Regent Honeyeater) may use this resource sporadically or on a seasonal basis.

Foraging habitat for insectivorous bird species exists in the canopy, understorey and groundcover levels of the SGTF. Threatened species which may use this resource include *Climacteris picumnus* (Brown Treecreeper) and *Pyrrholaemus sagittatus* (Speckled Warbler).

Large and medium-sized tree hollows were observed in the ecology study area to the north of the location of the pump station (see photos in **Appendix B**). Small hollows and fissures may also exist within the dead standing trees of the site. These hollows provide potential den, nest and roost sites for a number of bird, mammal and reptile species.

Threatened species which may use large hollows include *Tyto novaehollandiae* (Masked Owl), *Ninox strenua* (Powerful Owl), *Ninox connivens* (Barking Owl), *Petaurus australis* (Yellow-bellied Glider), *Callocephalon fimbriatum* (Gang-gang Cockatoo).

Smaller hollows may be used by hollow-roosting bats including *Falsistrellus tasmaniensis* Eastern False Pipistrelle, *Mormopterus norfolkensis* (Eastern Freetail-bat), *Scoteanax rueppellii* (Greater Broad-nosed Bat).

In addition to the bat species listed above, several other threatened, non hollow-roosting species may forage in the air spaces within and around the vegetation including *Chalinolobus dwyeri* (Large-eared Pied Bat) and *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat).

Threatened predatory birds including the owl species listed above and *Lophoictinia isura* (Square-tailed Kite) may hunt in the woodland of the ecology study area and nearby areas.

The leaf-litter, fallen logs and grass clumps of the ecology study area form potential habitat for the endangered Cumberland Land Snail *Meridolum corneovirens*.

The EPBC act search also showed that 14 migratory terrestrial, wetland and marine species protected under the act are likely to occur in the area. Of these the following species have moderate to high potential to occur on the site with respect to habitat attributes; *Hirundapus caudacutus* (White-throated Needletail), *Merops ornatus* (Rainbow Bee-eater), *Monarcha melanopsis* (Black-faced Monarch), *Myiagra cyanoleuca* (Satin Flycatcher), *Rhipidura rufifrons* (Rufous Fantail), *Xanthomyza phrygia* (Regent Honeyeater), *Ardea ibis* (Cattle Egret)and *Apus pacificus* (Fork-tailed Swift).

The waterways of the ecology study area and locality of the proposed rising main are presently subject to impacts associated with increased nutrients, sedimentation, weed invasion and the presence of exotic fish species. Only common native fish and frog species that are capable of persisting in highly disturbed waterways are considered likely to persist here. Although Hortons Creek contains some potential habitat for the Green and Golden Bell Frog *Litoria aurea*, this species is not considered likely to occur here due to the poor condition of the waterway and the fact that the species has not been recorded in the Hawkesbury LGA since the late 1970's.

The Black-faced Monarch, Satin Flycatcher and Rufous Fantail may breed in the area.

Species Name	Status	Likelihood of Occurrence	Database / Act
Callocephalon fimbriatum Gang-gang Cockatoo	Vulnerable	Moderate to High	TSC
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat, Large Pied Bat	Vulnerable	Moderate to High	EPBC, TSC
<i>Climacteris picumnus</i> Brown Treecreeper	Vulnerable	Moderate to High	TSC
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	Vulnerable	High to Moderate	TSC
<i>Lathamus discolor</i> Swift Parrot	Endangered	Moderate	EPBC, TSC
<i>Lophoictinia isura</i> Square-tailed Kite	Vulnerable	Moderate to High	TSC
<i>Melithreptus gularis gularis</i> Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Moderate to High	TSC
<i>Meridolum corneovirens</i> Cumberland Plain Land Snail	Endangered	Known in one section, Moderate to High in remainder.	TSC
<i>Miniopterus schreibersii oceanensis</i> Eastern Bentwing-bat	Vulnerable	Moderate to High	TSC
<i>Mormopterus norfolkensis</i> Eastern Freetail-bat	Vulnerable	Moderate to High	TSC
Ninox connivens Barking Owl	Vulnerable	Moderate to High	TSC
Ninox strenua Powerful Owl	Vulnerable	Moderate to High	TSC

 Table 5
 Threatened flora and fauna species and the likelihood of occurrence

Species Name	Status	Likelihood of Occurrence	Database / Act
<i>Petaurus australis</i> Yellow-bellied Glider	Vulnerable	Moderate	TSC
Phascolarctos cinereus Koala	Vulnerable	Moderate to High	TSC
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Moderate to High	EPBC, TSC
<i>Pyrrholaemus sagittatus</i> Speckled Warbler	Vulnerable	Moderate to High	TSC
Scoteanax rueppellii Greater Broad-nosed Bat	Vulnerable	High to Moderate	TSC
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	Moderate to High	TSC
<i>Xanthomyza phrygia</i> Regent Honeyeater	Endangered	Moderate	EPBC, TSC
Reference: DECC 2008			
5.0 Impact Assessment

5.1 Impacts on vegetation and flora species

5.1.1 Construction

The construction of the proposed pump station and access road would require the removal of a small amount (approx 0.01 ha) of highly disturbed SGTF within the adjacent road corridor for the construction of the access road. The removal of approximately four live immature trees (*Eucalyptus* and *Melaleuca* spp.) and one dead standing tree would be required. Some damage to the root systems of remaining trees may also be caused by construction works. Most of the vegetation affected is not considered SGTF as it contains very few understorey or groundcover species which are listed in the threatened ecological community profile and Scientific Committee final determination. The ground layer in the location of the pump station is dominated by exotic species and the few native species are commonly found in a variety of vegetation communities, including highly disturbed environments.

The dominance of exotic species in this community is such that it would be unlikely to regenerate and would require a reconstructive approach to be returned to near natural structure. This area has the potential however to be rehabilitated and integrated into the existing remnant through weed removal and revegetation. The construction of the pump station thus limits the potential for the recovery of this SGTF remnant. The revegetation of the remaining areas of exotic vegetation and regeneration works in the retained SGTF adjacent to the pump station site would contribute to the offset of this impact

The earthworks required for the installation of the rising main would require the removal and/or disturbance of approximately 0.35 ha of disturbed SGTF on the eastern edge of the unformed section of Bootles Lane and between Cattai Road and Old Pitt Town Road.

There is some potential for adjacent areas of SGTF and isolated trees to be impacted upon in other parts of the rising main route within the ecology study area through damage to tree roots caused during the digging of the trench.

Construction of the pump station, access road and rising main has the potential to exacerbate the weed situation of the ecology study area by introducing additional weed species, spreading weeds and causing soil disturbance. There is also the potential for the introduction of plant pathogens such as Phytophthora Root Rot fungus *Phytophthora cinnamomi*. If the mitigation measures described below are implemented however, the overall condition of the vegetation of the ecology study area could be improved.

Several specimens (8 stems) of *Acacia pubescens* occur in a small isolated patch (approx 0.005 ha) of native understorey vegetation near the boundary of the road reserve between chainage 857.39 and chainage 930.43. Hand excavation or boring would be used if the route passes through any individuals of this species to minimise potential damage. It has been assumed in this assessment that these individuals would be damaged during excavation.

Accidental damage to *Dillwynia tenuifolia* is possible but the likelihood of this occurring would be low given the proposed sewerage main route, construction methodology and mitigation measures. The alignment of the sewerage main has been re-designed to avoid *Dillwynia tenuifolia* individuals and potential habitat. Significant impacts on this species are not considered likely.

Some indirect impact on the Freshwater Wetlands EEC as a result of the installation of the sewerage main under Hortons Creek is possible due to disturbance of the creek bed. Given the small extent and poor condition of this vegetation and the nature of the works, this impact is not likely to be significant.

Tests of significance (7-part tests) and EPBC Act significance assessments have been conducted for *Acacia pubescens, Dillwynia tenuifolia* and SGTF and have concluded that no significant negative impact on these is likely to occur as a result of the proposal (See **Appendix C**).

EPBC Act threatened species assessments are also included in **Appendix C** for the species considered likely to be affected and have also concluded that no significant impact on these species is likely to occur.

Several other threatened species have a moderate potential to occur in the ecology study area including *Grevillea juniperina subsp. juniperina, Pimelea spicata* and *Pultenaea parviflora*. These species may be present but have gone undetected during investigation due to a cryptic habit or occurrence in the form of a soil-stored seedbank. None of these species are likely however to exist in the disturbed vegetation of the earthworks areas and hence significant impacts on these species are considered unlikely.

5.1.1.1 Operation

No significant impacts on flora and fauna are considered likely during operation of the pump station and rising main.

5.2 Impacts on fauna species and habitat

The construction activities proposed would result in the permanent removal of a very small amount (approx. 0.05 Ha) of degraded foraging habitat in the location of the pump station for some of the mobile threatened species described above.

The removal of disturbed SGTF vegetation for the rising main, as described above, would result in the loss of some potential foraging habitat. The removal of hollow-bearing trees would have the greatest influence on the severity of impacts on a number of threatened hollow-dependent species. No removal of known hollow-bearing trees would be necessary for construction and the impact on hollow-dependent fauna would is not likely to be significant. Most of the trees affected are not of sufficient size to produce hollows and many are ironbarks, a group of eucalypts that do not readily form hollows.

Most of the threatened and migratory fauna species likely to occur are highly mobile and are unlikely to be killed or injured during earthworks or use the affected areas exclusively. The Cumberland Land Snail is at risk, if it occurs here, as it is small and slow-moving and hence would be unable to flee and may not be detected during earthworks. This species was not detected on the site of the proposed pump station during targeted searches in the earthworks area or in surrounding relatively intact SGTF. The habitat in the earthworks areas is considered sub-optimal due to a lack of leaf-litter and the paucity of fallen logs.

The Cumberland land Snail was however detected in the patch of SGTF between Old Pitt Town Road and Hortons Creek. The route of the sewerage main has been re-designed to avoid this habitat. A test of significance (7-part test) has been conducted for this species and has concluded that no significant negative impact on this species is likely to occur as a result of the proposal (See **Appendix C**).

The earthworks area would only comprise a small proportion of the foraging range of individuals of threatened bird, bat and arboreal mammal species and would not result in the removal of likely roosting or nesting habitat. Members of these groups are therefore unlikely to be significantly affected by the proposal.

Significant impacts on native fish species are considered unlikely to occur as the pumping station and rising main would not create any disruption to fish passage and would have minimal effect on the hydrology of any waterway. No threatened fish species been recorded in the waterways of the ecology study area. No further consideration has therefore been given to the potential occurrence or impact on fish species.

5.2.1.1 Operation

No significant impacts on flora and fauna are considered likely during operation of the pump station and rising main.

6.0 Recommended Mitigation Measures

6.1 Flora

The potential impacts on threatened flora species and ecological communities would be mitigated in a number of ways:

- The minimum practicable clearing of SGTF and trees would be conducted for construction purposes and threatened species would be avoided where feasible. Trenches in the vicinity of retained trees are to be hand-excavated or bored and are to proceed only with approval of the site arborist. Hand excavation and boring would also be used to avoid the removal of threatened plants (i.e Downy Wattle *Acacia pubescens*). Any pruning of retained trees would be undertaken by the site arborist.
- The choice of equipment used in the installation of pump station and rising main would ensure that the minimum amount of disturbance would be required for access and earthworks in areas containing native vegetation.
- Earth-working equipment would be cleaned of excess soil by brushing or hosing prior to arrival and departure from work areas to minimise the likelihood of the spread of weed seeds and plant pathogens.
- Suitable control measures would be implemented to prevent erosion and sediment deposition as per the CEMP.
- Where practicable, minor alterations to the path of the rising main would be made to minimise impacts on SGTF, threatened plants and retained trees.
- Temporary fencing would be placed between areas containing threatened plant species and SGTF to be retained to exclude earthworks. Fencing would be placed outside the drip-line of trees where possible.
- Regeneration and revegetation of disturbed areas on and adjacent to the construction areas would be conducted using local provenance plant species indigenous to the SGTF EEC. This would include the entire area (0.5 Ha) of exotic vegetation and poor condition SGTF adjacent to the pump station (see **Figure 2**) and the entire unformed section of Bootles Lane. Revegetation of existing road corridors and areas zoned as future roads would be restricted to the installation of a weed-free mulch and the planting of native grasses and other native groundcover vegetation to prevent erosion. Where the sewer main causes damage to public parks, turf should be replaced after backfilling is completed.
- Bushland regeneration would be conducted by a suitably qualified and experienced contractor after the end of construction works in all areas of retained vegetation and revegetated areas. Weeds, especially Kikuyu Grass and noxious weeds, must be adequately controlled prior to revegetation and maintained at a low (less than 90% of current) density during this period.
- The distance between open trenches and retained trees would be maximised within the constraints imposed by existing and planned infrastructure such as roads and other services.
- All trees requiring removal for the construction of the pump station and access road would be cut into manageable lengths for use in habitat augmentation within the adjacent SGTF remnant.
- All other native vegetation cleared would be mulched and stockpiled on site for later use in soil stabilisation and vegetation rehabilitation. Mulch would be stockpiled in disturbed vegetation adjacent to the pump station and/or rising main so as to minimise disturbance to native vegetation and the spread of weeds. Advice would be sought from an ecologist to determine suitable locations for stockpiles.
- An ecologist or suitably experienced and licensed bushland regenerator would be present for all tree-felling to collect seeds for use in revegetation.
- Excavated soil would be separated into topsoil and subsoil components and replaced in its original order during backfilling to facilitate regeneration and revegetation activities.
- Retained trees would be monitored during vegetation rehabilitation and any signs of poor health reported to HCC and the site arborist in order to determine an appropriate course of action.

• All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

6.2 Fauna

The mitigation measure described in **Section 6.1** above for the protection of native flora would also assist in the protection of habitat for fauna species.

Additional mitigation measures would include:

- An ecologist would be present during the removal of any large woody debris in order to relocate any native fauna using this habitat to retained strands of SGTF. If any additional threatened species are discovered works would cease immediately. Advice would be sought from the Hawkesbury City Council ecologist and appropriate measures would be implemented to protect or relocate individuals of these species prior to the resumption of works. The discovery would also be reported to the DECC.
- Fallen logs would be relocated from earthworks areas to adjacent patches of SGTF under the supervision of an ecologist.
- All mitigation measures would be incorporated into the Vegetation and Fauna Management subplan component of the CEMP.

7.0 References

DECC 2008 *Threatened species, populations and ecological communities of NSW – Species Profiles.* Threatened species Website <u>http://www.threatenedspecies.environment.nsw.gov.au/index.aspx</u> NSW Department of Environment and Climate Change.

Harden 2007 Flora of New South Wales (Volumes 1-4). University of New South Wales Press.

Lands 2006 *East Coast Aerial Photos (Med-High resolution)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

Lands 2007 *Topographic maps (Current Series)* NSW Department of Lands SIX Viewer, six.maps.nsw.gov.au

Maunsell 2008 *Pitt Town Pump Station and Rising Main Flora and Fauna Report.* Report prepared for Johnson Property Group by Maunsell Australia Pty Ltd.

NPWS 2002 Native Vegetation of the Cumberland Plain, Western Sydney NSW National Parks & Wildlife Service – 1:25 000 Map Series

Appendix A Flora and Fauna Inventories

Appendix A Flora and Fauna Inventories

Table 1 Fa	una species	recorded	during	survey
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Common Name	Scientific Name	Status
Birds		
Australian Magpie	Gymnorhina tibicen	Protected
Brown Goshawk	Accipiter fasciatus	Protected
Brown Thornbill	Acanthiza pusilla	Protected
Common Bronzewing	Phaps chalcoptera	Protected
Eastern Spinebill	Acanthorhynchus tenuirostris	Protected
Grey Fantail	Rhipidura fuliginosa	Protected
Jack Winter	Microeca leucophea	Protected
Laughing Kookaburra	Dacelo novaeguineae	Protected
Magpie Lark	Grallina cyanoleuca	Protected
Noisy Friarbird	Philemon corniculatus	Protected
Noisy Miner	Manorina melanocephala	Protected
Pied Currawong	Strepera graculina	Protected
Rainbow Lorikeet	Trichoglossus haematodus	Protected
Silvereye	Zosterops lateralis	Protected
Spotted Pardalote	Pardalotus punctatus	Protected
Superb Fairy Wren	Malurus cyaneus	Protected
White-cheeked (Eastern) Rosella	Platycercus eximius	Protected
Willie Wagtail	Rhipidura leucophrys	Protected
Yellow Thornbill	Acanthiza nana	Protected
Reptiles		
Dark-flecked Garden Sunskink	Lampropholis delicata	Protected
Eastern Water-skink	Eulamprus quoyii	Protected
Common Bearded Dragon	Pogona barbata	Protected
Frogs		
Eastern Dwarf Tree Frog	Litoria fallax	Protected
Invertebrates		
Cumberland Land Snail	Meridolum corneovirens	Endangered

Table 2 Flora species recorded during survey

Scientific name	Status
Acacia parramattensis	Native
Acacia pubescens	Vulnerable (EPBC Act, TSC Act)
Alternanthera denticulata	Native
Araujia sericifera	Weed
Aristida vagans	Native
Asparagus aethiopicus	Weed
Austrodanthonia tenuior	Native
Bidens pilosa	Weed
Brachycome multifida var. multifida	Native
Bursaria spinosa	Native
Cheilanthes sieberi subsp. sieberi	Native
Chloris virgata	Weed
Commelina cyanea	Native
Conyza sp.	Weed
Cylindropuntia sp.	Weed
Desmodium varians	Native
Dianella revoluta var. revoluta	Native

Scientific name	Status
Dichondra repens	Native
Dillwynia sieberi	Native
Dillwynia tebuifolia	Vulnerable (EPBC Act, TSC Act)
Echinochloa crus-galli	Weed
Echinopogon ovatus	Native
Entolasia stricta	Native
Eragrostic curvula	Weed
Eremophila debilis	Weed
Eriochloa pseudoacrotricha	Native
Eucalyptus fibrosa	Native
Eucalyptus moluccana	Native
Eucalvptus tereticornis	Native
Euchiton sphaericus	Native
Glycine clandestina	Native
Goodenia hederacea subsp. hederacea	Native
Grevillea robusta	Weed
Hardenbergia violacea	Native
Ipomoea purpurea	Weed
Juncus usitatus	Native
Lepidosperma laterale	Native
Ligustrum lucidum	Weed
l omandra multiflora subsp. multiflora	Native
Melaleuca decora	Native
Melia azedarach	Native
Microlaena stipoides var stipoides	Native
Oplismenus aemulus	Native
Opercularia diphylla	Native
Oxalis perennans	Native
Panicum simile	Native
Parsonsia straminea	Native
Paspalum urvillei	Weed
Pennisetum clandestinum	Weed
Phragmites australis	Weed
Pomax umbellata	Native
Poranthera microphylla	Native
Pratia purpurascens	Native
Ricinus communis	Weed
Rubus fruticosus	Weed
Sida rhombifolia	Weed
Solanum americanum	Weed
Solanum mauritianum	Weed
Solanum nigrum	Weed
Tagetes minuta	Weed
Themeda australis	Native
Tricoryne elatior	Native
Typha orientalis	Native
Verbascum virgatum	Weed
Verbena bonariensis	Weed
Vernonia cinerea var cinerea	Native

Appendix B Site Photographs

Appendix B Site Photographs

Photograph 1 – Acacia pubescens in unformed section of Bootles Lane



Photograph 2 – Disturbed vegetation near pump station location.



Photograph 3 - Relatively intact CPW near pump station location.





Photograph 4 – Mature trees containing hollows near pump station location

Appendix C TSC Act & EPBC Act Threatened Species Assessments

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1.0 TSC Act Threatened Species Impact Assessment

1.1 Seven-part test – Downy Wattle Acacia pubescens

Acacia pubescens is a spreading shrub, 1 - 4 m high with brilliant yellow flowers, bipinnate leaves (divided twice pinnately) and conspicuously hairy branchlets (DEC, 2005).

The distribution of *Acacia pubescens* is concentrated areas in Western Sydney including one in the Pitt Town area DEC (2005).

This species occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone DEC (2005).

It occurs in open woodland and forest, in a variety of plant communities including Cumberland Plain Woodland DEC (2005).

a) in the case of a threatened species, whether the action proposed 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 longevity of the species is unknown, but clonal species have been known to survive for many decades. Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod production and seed fall for this species appears to be low DEC (2005). The proposed activity would not result in significant damage to or removal of mature specimens of *A. pubescens* and hence is unlikely to limit their ability to reproduce vegetatively.

Flowering occurs from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December DEC (2005). As the proposed activity is not likely to have significant long term negative impacts on populations of potential pollinators or limit their movements, it is unlikely to alter the genetic transfer within the local population as a result of cross-fertilisation.

Acacia species generally have high seed dormancy and long-lived persistent soil seedbanks. It is thought that the species needs a minimum fire free period of 5 - 7 years to allow an adequate seedbank to develop DEC (2005). The proposed activity is not likely to affect fire regimes in the locality and hence would not impact significantly on the formation of a seedbank. Soil disturbance as a result of the action may cause soil-stored seeds of this species to germinate. As the duration of the proposed action would be brief, it is unlikely that seedlings would germinate and be damaged during earthworks.

The impact of the proposed action is hence not likely to place the local population of this species at risk of extinction.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

- d) 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 action proposed, and

Damage to a small amount (<0.36Ha) of native groundcover and under-storey vegetation which is habitat for *A. pubescens* would occur. Much of the area that would be impacted upon is currently dominated by weed species and would be revegetated with Cumberland Plain Woodland groundcover and understorey species thereby reducing the threat of weed invasion on remaining *A. pubescens* habitat.

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

The study area is fragmented from areas of contiguous *A. pubescens* habitat by several roads and cleared areas. There will be no further fragmentation as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

Given that:

- The percentage of *A. pubescens* habitat that could be affected is a small proportion of the total remaining in the study area and broader locality and;
- Mitigation measures would be implemented to prevent damage to specimens of *A. pubescens* and the species' habitat and;
- Regeneration and revegetation would enhance retained A. pubescens habitat,
- it is considered that unlikely that the proposed activity would have significant negative impact on the long-term survival of the species in the locality.
- e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The habitat found in the study area is not listed as critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has been approved for *A. pubescens* (NPWS, 2003). The proposed action is consistent with the objectives of the recovery plan. Specific objectives that the proposed action will help to achieve are:

- to ensure that a representative sample of *A. pubescens* populations occurring on public and private lands are protected from habitat loss and managed for conservation;
- to reduce the impacts of threats at sites across the species' range;

Bushland regeneration and revegetation of *A. pubescens* habitat adjacent degraded areas will help to conserve the species and reduce the impact of threatening processes such as the invasion of exotic perennial grasses.

The proposed action is not inconsistent with the other objectives listed in the recovery plan. There are no threat abatement plans which apply to this species.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Several threatening processes may affect A. pubescens:

Clearing of native vegetation is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006)

and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Some native vegetation would be cleared for the proposed action. Substantial rehabilitation of vegetation adjacent to the site will occur once construction activities have finished and this will result in enhancement to the condition of retained vegetation in the study area.

Invasion of native plant communities by exotic perennial grasses is a key threatening process (KTP) which is affecting the *A. pubescens* habitat of the study site. The impact of this KTP on the *A. pubescens* could be exacerbated as a result of the proposal. The mitigation measures described should, however prevent and even reduce the existing impact of this process on *A. pubescens*.

Competition and grazing by the feral European rabbit may also be affecting this population of *A. pubescens*. The proposed action is unlikely exacerbate this process and may help to mitigate its impact through the removal of dense blackberry cover and the enhancement of *A. pubescens* habitat.

The ecological consequences of high frequency fires KTP is unlikely to be affected by the proposed action as it would not result the ignition of fires or changes to the fire management regime of the study area.

The *infection of native plants by Phytophthora cinnamomi* KTP could be potentially be exacerbated by the proposed action but this outcome is unlikely as mitigation measures would be implemented to prevent the transmission of this soil-borne pathogen during earthworks.

Conclusion

Based on the above investigation, we consider there is no need for a Species Impact Statement to be conducted on the impacts of the proposed action on *A. pubescens*.

References

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1.2 Seven-part test – Cumberland Land Snail Meridolum corneovirens

Meridolum corneovirens is an endangered species according to the TSC Act. It is a large, native snail species which typically has a shell diameter of 15-30 mm and is tan to dark brown with a green or yellow tinge (NPWS, 2000).

Meridolum corneovirens is restricted to the Cumberland Plain region of western Sydney – a region that has been largely cleared of native vegetation. Although *Meridolum corneovirens* is known from over 100 locations, these populations are small, scattered and isolated (NPWS, 2000).

Populations have been identified within three kilometres of the study area (Figure 1) and the species was detected between Old Pitt Town Road and Hortons Creek.



Figure 1 - Location of species recordings in the vicinity of the study area and proposed action.

Very little is known about the biology and life history of *Meridolum corneovirens*. It is hermaphroditic and lays clutches of 20-25 small, round white eggs in moist, dark areas and these eggs take 2-3 weeks to hatch (NPWS, 2000). *Meridolum corneovirens* is a nocturnal fungivore (NPWS, 2000) that will not eat plant matter at all (Australian Museum, 2006). Populations of *Meridolum corneovirens* are highly structured at very short distances (two metres) and the genetic neighbourhood – an indication of the distances moved by individuals between birth and breeding – is only 350 metres (Clark & Richardson, 2002).

Threats to *Meridolum corneovirens* arise from clearing and habitat modification, such as weed invasion, inappropriate fire management and removal of ground cover (NPWS, 2000). *Meridolum corneovirens* have been recorded at several sites within three kilometres of the study area since 1990 (NPWS, 2000). Surveys during wet periods are more likely to reveal the presence of this species (Australian Museum, 2006).

a) in the case of a threatened species, whether the action proposed 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,

Little is known about the life cycle of *Meridolum corneovirens*. The species has very limited dispersal ability and hence interaction between populations is believed to be minimal. Eggs are laid in moist situations, often under logs and other debris. No fragmentation of potential habitat would occur as result of the proposal.

No disturbance of vegetation, leaf-litter or woody debris would occur within the patch of woodland in the study area that is known habitat for the species. Woody debris in areas that require clearing would be relocated to retained vegetation such that it remains available to the species post-construction, should it occur in these areas.

The proposed action is not considered likely affect the lifecycle of a viable local population of this species such that it is placed at a significantly increased risk of extinction.

b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
 - (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

d) in relation to the habitat of a threatened species, population or ecological community:

Meridolum corneovirens is restricted to the woodlands of the Cumberland Plain in Western Sydney, where it typically occurs under logs and other debris, amongst leaf and bark accumulations around the bases of trees, and sometimes under grass clumps (NPWS, 2000). It will burrow into loose soil wherever possible (NPWS, 2000).

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

The approximately 0.36 hectares of moderately disturbed SCFF vegetation that would be removed or disturbed comprises a small proportion of the remaining potential habitat for the species in the study area. Targeted searches did not detect the species in the woodland that would be removed. The area in which the species was detected would be avoided in order to minimize disturbance to potential habitat of this species.

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

The study area is fragmented from areas contiguous vegetation by several roads and cleared areas. There will be no further fragmentation as a result of the proposal. Given the small range that individual *Meridolum corneovirens* inhabit and their limited dispersal ability, minimal genetic exchange between separate populations in the locality is expected.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

The small amount of vegetation to be removed is unlikely to be of importance to the long-term survival of a population of *Meridolum corneovirens* in the locality. The regeneration and revegetation of SGTF

in the vicinity of the pump station would likely result in an increase in higher quality habitat for the species in the medium to long term.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The habitat found in the study area is not listed as critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has not been prepared for the Cumberland Land Snail. There are no threat abatement plans of relevance to the Cumberland Land Snail.

The following priority actions have been identified by DECC as having relevance to the species:

- Approach priority private site landholders to negotiate implementing protective management regimes. (Low priority)
- Ensure public land plans of management include appropriate actions for species' protection. (Medium priority)
- Identify priority sites for conservation actions on private land. (Low priority)
- Implement appropriate fire regimes (ones that allow build up of grass and litter layers). (Medium priority)
- Implement weed control at sites where necessary. (Medium priority)
- Install structures (where necessary) to prevent accidental slashing and removal of plant debris. (Medium priority)
- Investigate population census techniques and responses to environmental conditions, with the aim of developing estimates of true population size based on numbers detected in standard surveys. (Low priority)
- Reserve Fire Management Strategy to include operational guidelines to protect this species from fire. . (Medium priority)
- Review species' conservation status with consideration of data obtained since listing as endangered. (Low priority)

The construction methodology and mitigation measures proposed are consistent with these actions in that they would minimize the extent of habitat disturbance and include measures to protect habitat including weed control, relocation of woody debris and exclusion fencing.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Clearing of native vegetation - is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006) and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Some clearing of SGTF could occur. The vegetation clearance proposed is not considered likely to significantly impact the biodiversity of the study area. Highly disturbed vegetation adjacent to the pump station locality would be rehabilitated once construction activities have finished which would result in an improvement to the condition of this, the largest and most intact remnant.

Conclusion

Meridolum corneovirens is an endangered species known to occur in at least one location within the study area. Due to the degraded nature of the area that will be impacted upon by the proposal and

the proposed mitigation measures no significant impact is on this species is considered likely to occur due to the proposal.

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1.3 Seven-part test – Shale Gravel Transition Forest

Shale Gravel Transition Forest (SGTF) is listed as an Endangered Ecological Community under the *Threatened Species Conservation Act 1995*. This community is not listed under the *Environmental Protection Biodiversity Conservation Act 1999*. Shale Gravel Transition Forest is typically dominated by one or more of the following: Broad-leaved Ironbark *Eucalyptus fibrosa* with Grey Box, *Eucalyptus moluccana*, and Forest Red Gum *Eucalyptus tereticornis* occurring less frequently. The understorey is dominated by Blackthorn *Bursaria spinosa, Daviesia ulicifolia*, and Peach Heath *Lissanthe strigosa* (DEC 2005). This community has been identified in several parts of the study area.

a) in the case of a threatened species, whether the action proposed 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,

Not applicable.

Figure 1 – Approximate extent of SGTF in study area.



b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable.

- c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
 - (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

The following impacts to Shale Gravel Transition Forest would occur as a result of the proposed development:

Approximately 0.36ha of SGTF of poor to moderate condition would be removed

Damage may occur to the root systems of canopy species as a result of earthworks.

It is not considered that a significant area of Shale Gravel Transition Forest will be impacted such that its local occurrence is likely to be placed at risk of extinction or that impacts are likely to substantially and adversely modify the composition of the ecological community due to the extent of clearing and the mitigation and offset measures that would be implemented.

(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,

The retained patches of SGTF vary in condition from highly to moderately disturbed condition.

The proposal is unlikely to modify the composition of the retained areas of the ecological community such that its local occurrence is likely to be placed at risk of extinction. Proposed regeneration activities are likely to improve the long-term viability of the large remnant of SGTF adjacent to the pump station.

These management controls and compensatory actions will reduce the impact of the proposed activity and significantly improve the quality of retained vegetation within the study area.

- d) 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 action proposed, and

The following impacts to SGTF habitat could potentially occur as a result of the substation development:

- Approximately 0.35ha of highly and moderately disturbed SGTF would be removed or disturbed for the installation of the sewerage main. This area would be revegetated with SGTF species post-construction.
- Approximately 0.01ha of highly disturbed SGTF would be lost for the construction of the pump station. Adjacent exotic vegetation would be removed and replaced with SGTF species.
 - (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The study area is fragmented from areas of contiguous vegetation by several roads and cleared areas. There will be minimal further fragmentation as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the longterm survival of the species, population or ecological community in the locality,

Given that:

- The percentage SGTF that could be affected is less a small proportion of the total remaining SGTF in the study area and;
- Mitigation measures would be implemented to prevent excess damage to SGTF and;
- Regeneration and revegetation would be conducted in rertained SGTF and adjacent exotic vegetation,

It is considered that the proposed activity would not have a significant negative impact on the long-term survival of the ecological community in the locality.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The study area does not contain critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan entitled *Recovery planning for the Cumberland Plain's endangered ecological communities* is currently in preparation. As such, the objectives and actions of this plan are yet to be finalised and are not considered here in detail. It is however, considered likely that the proposed action would be broadly consistent with the objectives of this plan.

There are no threat abatement plans which apply to this EEC.

The following priority actions have been identified by DECC for this EEC:

- Develop and implement Cumberland Plain Reservation Strategy and create a protected bushland network through targeted land acquisition as land becomes available. (High priority)
- Encourage and promote best-practice management of EECs on private land. (Medium priority)
- Encourage planning authorities to address EECs in development of environmental planning instruments and, where possible, seek biodiversity certification. (Medium priority)
- Ensure the consideration of impacts on EECs when enforcing noxious weed or pest species control in EECs. (Medium priority)
- Finalise the multi-EEC recovery plan as a State priority in accordance with contractual obligations with DEH, by July 2007. (Medium priority)
- Incorporate consideration of EEC protection in regional open space planning. (High priority)
- Investigate the development of a regular monitoring program to assess the change in extent of vegetation across the Cumberland Plain. (Medium priority)
- Investigate the preparation of a recommendation for the declaration of critical habitat. (Low priority)
- Liaise with institutions to facilitate research relevant to the recovery of Cumberland Plain EECs. (Low priority)
- Manage, to best practice standards, areas of EECs which have conservation as a primary objective, or where conservation is compatible. Priorities are to be based on DEC conservation significance assessment. (High priority)
- Management of EECs is to be included in school environmental management plans where the school land contains EECs. (Medium priority)
- Management of EECs to be included in the conditions for Crown land trusts, lease and licence holders. (Medium priority)
- Prepare and implement community awareness, education and involvement strategy. (Medium priority)
- Promote best practice management guidelines. (Medium priority)
- Public authorities will promote management agreements to landholders through their ongoing land use planning activities. (Medium priority)
- Support community conservation by providing nursery or other facilities, for regeneration activities. (Low priority)

The mitigation and rehabilitation measures which would be conducted as part of the proposed action would be consistent with these management principles.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Several threatening processes may affect SGTF.

Clearing of native vegetation is a key threatening process. The clearing of native vegetation is listed as a key threatening process because of the loss of biodiversity associated with clearing (DEC, 2006)

and the cumulative impact of hundreds of actions shaving tiny areas off the surviving remnants leading to extinction debts (Tilman et al. 2002).

Clearing of native vegetation would be kept to the minimum required to construct the pump station and rising main.. Substantial rehabilitation of vegetation adjacent to the site will occur once construction activities have finished and this would result in an improvement to the retained SGTF in the patch adjacent to the pump station.

Invasion of native plant communities by exotic perennial grasses is listed as a key threatening process (KTP) which is affecting the SGTF of the study site. The impact of this KTP on the SGTF could be exacerbated as a result of the proposal. The mitigation measures described should, however prevent and even reduce the existing impact of this process on the remnant SGTF.

Competition and grazing by the feral European rabbit is also affecting this SGTF. The proposed action is unlikely exacerbate this process and may help to mitigate its impact through the removal of dense blackberry cover and the enhancement of groundcover and understorey species diversity and abundance.

The ecological consequences of high frequency fires KTP is unlikely to be affected by the proposed action as it would not result the ignition of fires or changes to the fire management regime of the study area.

The *infection of native plants by Phytophthora cinnamomi* KTP could be potentially be exacerbated by the proposed action but this outcome is unlikely as mitigation measures would be implemented to minimise the likelihood of transmission of this soil-borne pathogen during earthworks.

Conclusion

The Shale Gravel Transition Forest would be adversely affected by some aspects of the proposed action.

Due to the degraded nature of much of the area that will be impacted upon by the proposal and the proposed mitigation measures, no significant negative impact is on this EEC is considered likely to occur due to the proposed action.

Based on the above investigation, we consider that the impacts of the proposed action on Shale Gravel Transition Forest are not likely to be significant.

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2.0 EPBC Act Threatened Species Assessment

2.1 Downy wattle - *Acacia pubescens*

Assessment against significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

· lead to a long-term decrease in the size of an important population of a species;

The proposal may result in a reduction of the population of the species in the study area. The individuals that would be affected however are isolated from other individuals and significant areas of habitat.

The population of *A. pubescens* within the larger woodland remnant adjacent to the pump station may be considered an important population but the proposed action is not considered likely to lead to a long term decrease in this population.

• reduce the area of occupancy of an important population;

The area currently occupied by this population would not be reduced by the proposed action.

• fragment an existing important population into two or more populations;

No fragmentation of important populations of the species would occur as a result of the proposal.

· adversely affect habitat critical to the survival of a species;

No habitat critical for the survival of the species is present in the study area.

• disrupt the breeding cycle of an important population;

No disruption to the breeding cycle of this species is expected to occur as a result of the proposed action. The individuals that may be directly affected are isolated from significant populations of the species and hence minimal genetic interaction is expected.

• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

The habitat affected by the proposed action is of low quality and is highly fragmented. The proposed action is not expected to affect higher quality areas of habitat for the species and hence is not expected to contribute significantly to the decline of the species in the locality.

• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;

Invasive weed species are already present in the habitat of this species. The mitigation measures that would be implemented as part of the proposed action would ensure that the likelihood of the establishment of additional weed species and the spread of existing species would be low.

• introduce disease that may cause the species to decline;

Earthworks required for the project have the potential to introduce pathogens such as Phytophthora root-rot fungus. It is a requirement that construction equipment is clear of mud of mud and other debris before entering the construction site. With this measure in place the likelihood of introducing plant pathogens to the site is considered to be low.

• interfere substantially with the recovery of the species.

Construction of the pump station would reduce the area available for *A. pubescens* to spread from the adjacent woodland vegetation through the removal of some highly disturbed vegetation. Weed control and revegetation would however improve the condition of the remaining disturbed vegetation such that the ability of the species to establish here would be increased in the long-term.

2.2 Dillwynia tenuifolia

Assessment against significant impact criteria

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

lead to a long-term decrease in the size of an important population of a species;

The proposal is unlikely to result in a reduction of the population of the species in the study area as the proposed construction methodology would avoid direct impacts on this species.

The population of *D. tenuifolia* may be considered an important population but the proposed action is not considered likely to lead to a long term decrease in this population.

reduce the area of occupancy of an important population;

The area currently occupied by this population would not be reduced by the proposed action.

• fragment an existing important population into two or more populations;

No fragmentation of important populations of the species would occur as a result of the proposal.

adversely affect habitat critical to the survival of a species;

No habitat critical for the survival of the species is present in the study area.

disrupt the breeding cycle of an important population;

No disruption to the breeding cycle of this species is expected to occur as a result of the proposed action.

• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

The habitat which may be indirectly affected by the proposed action is of low quality and is highly fragmented. The proposed action is not expected to affect habitat for the species and hence is not expected to contribute significantly to the decline of the species in the locality.

• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;

Invasive weed species are already present in the habitat of this species. The mitigation measures that would be implemented as part of the proposed action would ensure that the likelihood of the establishment of additional weed species and the spread of existing species would be low.

• introduce disease that may cause the species to decline;

Earthworks required for the project have the potential to introduce pathogens such as Phytophthora root-rot fungus. It is a requirement that construction equipment is clear of mud of mud and other debris before entering the construction site. With this measure in place the likelihood of introducing plant pathogens to the site is considered to be low.

• interfere substantially with the recovery of the species.

No interference with the recovery of the species is likely to occur as result of the proposed action. No significant change in the population of the species or its habitat is likely and hence the contribution of this population to the recovery of the species would not be altered.

Conclusion

No significant impacts on EPBC Act listed species are likely to occur as a result of the proposed activity. Referral of the proposed development to DEWHA for approval on the basis of potential impacts on flora and fauna is not considered necessary.

Appendix D Threatened Species Habitat Assessment

Appendix D Threatened Species Habitat Assessment

Table 1 Threatened flora species recorded or considered likely to occur in vicinity and likelihood of occurrence on the study site.

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Acacia bynoeana	Vulnerable (EPBC)	Occurs in heath or dry sclerophyll forest on sandy soils.	Very Low	EPBC, TSC
Bynoe's Wattle	Endangered (TSC)			
Acacia gordonii	Endangered	Grows in dry sclerophyll forest and heathlands amongst or within rock platforms on sandstone outcrops.	Very Low	EPBC, TSC
Acacia pubescens Downy Wattle	Vulnerable	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone.	High Recorded on site	EPBC, TSC
Allocasuarina glareicola	Endangered	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla and Melaleuca decora.	Low to Moderate	TSC
Ancistrachne maidenii	Vulnerable	Habitat requirements appear to be specific, with populations occurring in distinct bands in areas associated with a transitional geology between Hawkesbury and Watagan soil landscapes	Very Low	TSC
<i>Cryptostylis hunteriana</i> Leafless Tongue- orchid	Vulnerable	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis).	Low	EPBC, TSC
Darwinia biflora	Vulnerable	Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Very Low	EPBC, TSC
Dillwynia tenuifolia	Vulnerable	In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland	High Recorded on site	EPBC, TSC
Hibbertia superans	Endangered	The species occurs on sandstone ridgetops often near the shale/sandstone boundary.	Very Low	TSC

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Epacris purpurascens var. purpurascens	Vulnerable	Found in a range of habitat types, most of which have a strong shale soil influence.	Moderate to	TSC
Eucalyptus sp. Cattai	Endangered	Occurs in scrub, heath and low woodland on sandy soils, sites being generally flat and on ridge tops	Very Low	TSC
Grevillea juniperina subsp. juniperina Juniper-leaved Grevillea	Vulnerable	Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels.	High	TSC
Grevillea parviflora subsp. supplicans	Endangered	Occurs in heathy woodland associations on skeletal sandy soils over massive sandstones	Very Low	TSC
Kunzea rupestris	Vulnerable (EPBC) Endangered	Grows in shallow depressions on large flat sandstone rock outcrops.	Very Low	EPBC, TSC
Leucopogon fletcheri	(TSC) Endangered	Occurs in dry eucalypt woodland or in	Moderate	TSC
subsp. fletcheri		shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs.		
Melaleuca deanei	Vulnerable	The species grows in heath on sandstone.	Very Low	EPBC, TSC
Deane's Melaleuca				
Micromyrtus blakelyi	Vulnerable	shallow sandy soil in cracks and depressions of sandstone rock platforms.	Very Low	EPBC, TSC
Micromyrtus minutiflora	Vulnerable (EPBC) Endangered (TSC)	Grows in Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	Moderate to Low	EPBC, TSC
Olearia cordata	Vulnerable	Grows in dry open sclerophyll forest and open shrubland, on sandstone ridges.	Very Low	EPBC, TSC
Persoonia hirsuta	Endangered	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Very Low	EPBC, TSC
Persoonia nutans	Endangered	Confined to aeolian and alluvial sediments and occurs in a range of sclerophyll forest and woodland vegetation communities.	Very Low	EPBC, TSC
Pimelea curviflora var. curviflora	Vulnerable	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands.	Very Low	EPBC, TSC
Pimelea spicata Spiked Rice-flower	Endangered	In both the Cumberland Plain and Illawarra environments this species is found on well-structured clay soils. It is associated with Gray Box and Jonhark	Moderate to High	EPBC, TSC
Pomaderris brunnea	Vulnerable	Brown Pomaderris grows in moist woodland or forest on clay and alluvial	Moderate	EPBC
Brown Pomaderris		soils of flood plains and creek lines		

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act	
Pterostylis saxicola	Endangered	Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff	Very Low	EPBC	
Sydney Plains		lines.			
Greenhood					
Pultenaea parviflora	Vulnerable (EPBC) Endangered (TSC)	May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays.	Moderate to High	EPBC, TSC	
Tetratheca glandulosa	Vulnerable	Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone.	Very Low	EPBC, TSC	
Zieria involucrata	Endangered	Occurs primarily on Hawkesbury sandstone. Also occurs on Narrabeen Group sandstone and on Quaternary alluvium.	Very Low	TSC	
Reference: Habitat requirements extracted from DECC threatened species profiles.					

Species Name	Status	Habitat Requirements / Comment	Likelihood of	Database /
			Occurrence	Act
Botaurus poiciloptilus	Vulnerable	Favours permanent treshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.)	Very Low	TSC
Australasian Bittern		and spikerushes (Eleoacharis spp.).		
Burhinus grallarius	Endangered	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber.	Moderate	TSC
Bush Stone-curlew				
Cacatua leadbeateri Major Mitchell's	Vulnerable	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water.	Low	TSC
Collocophalon	Vulporablo	In summer generally found in tall	High	TSC
fimbriatum Gang-gang Cockatoo	Vuinerable	mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.		
Calyptorhynchus lathami Glossy Black- Cockatoo	Vulnerable	Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur	Moderate	TSC
Chalinolobus dwyeri	Vulnerable	Roosts in caves (near their	Moderate to	EPBC, TSC
Large-eared Pied Bat, Large Pied Bat		entrances), crevices in cliffs, old mine workings and in the disused, bottle- shaped mud nests of the Fairy Martin (Hirundo ariel), frequenting low to mid- elevation dry open forest and woodland close to these features.	High	
<i>Climacteris picumnus</i> Brown Treecreeper	Vulnerable	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	High to Moderate	TSC
Dasyurus maculatus	Endangered (EPBC – SE	Recorded across a range of habitat types, including rainforest, open	Moderate to Low	EPBC, TSC
Spot-tailed Quoll	mainland) Vulnerable (TSC)	inland riparian forest, from the sub- alpine zone to the coastline.		
Ephippiorhynchus asiaticus Black-necked Stork	Endangered	Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands	Very Low	TSC

Table 2 Threatened fauna species recorded or considered likely to occur in vicinity and likelihood of occurrence in the study area.

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
Falsistrellus tasmaniensis	Vulnerable	Prefers moist habitats, with trees taller than 20 m.	High to Moderate	TSC
Eastern False Pipistrelle		Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.		
Grantiella picta	Vulnerable	Inhabits Boree, Brigalow and Box- Gum Woodlands and Box-Ironbark Forests	Low to Moderate	TSC
Painted Honeyeater Heleioporus	Vulnerable	Found in heath woodland and open	Low	FPBC TSC
australiacus	vuniciable	forest with sandy soils		21 20, 100
Giant Burrowing Frog) (. la sus h la	Sholtors in rock crovices and under		
Hoplocephalus bungaroides Broad-headed Snake	(EPBC, TSC Act)	flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Very Low	EPBC, TSC
		Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer.		
Irediparra gallinacea	Vulnerable	Inhabits permanent wetlands with a good surface cover of floating vegetation, especially water-lilies.	Very Low	TSC
Comb-crested Jacana	Endonconod	They are generally only found in heath	1.000	
obesulus	Endangered	or open forest with a heathy understorey on sandy or friable soils.	LOW	EPBC, ISC
Southern Brown Bandicoot				
Ixobrychus flavicollis	Vulnerable	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense	Very Low	TSC
Black Bittern		vegetation.		
Lathamus discolor	Endangered	On the mainland they occur in areas where eucalypts are flowering	High to Moderate	EPBC, TSC
Swift Parrot		profusely or where there are abundant		
		infestations. Commonly used lero		
		infested trees include Grey Box E.		
		microcarpa, Grey Box E. moluccana		
Limosa limosa	Vulnerable	Primarily a coastal species.	Very Low	EPBC, TSC
Black-tailed Godwit		Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats		
Litoria aurea	Vulnerable	Inhabits marshes, dams and stream-	Low-Moderate	EPBC, TSC
Green and Golden Bell Frog	(EPBC)	sides, particularly those containing bullrushes		
	Endangered (TSC)			
Litoria littlejohni	Vulnerable	It occurs along permanent rocky streams with thick fringing vegetation	Very Low	EPBC, TSC
Littlejohn's Tree Frog		associated with eucalypt woodlands and heaths among sandstone outcrops.		

Species Name	Status	Habitat Requirements / Comment	Likelihood of	Database /
			Occurrence	Act
Lophoictinia isura	Vulnerable	Found in a variety of timbered habitats	High to	TSC
		forests. Shows a particular preference	Moderate	
Square-tailed Kite		for timbered watercourses		
Melithreptus gularis	Vulnerable	Occupies mostly upper levels of drier	High	TSC
gularis		open forests or woodlands dominated		
		especially Mugga Ironbark		
Black-chinned		(Eucalyptus sideroxylon), White Box		
Honeyeater (eastern		(Eucalyptus albens), Grey Box		
subspecies)		(Eucalyptus microcarpa), renow Box (Eucalyptus melliodora) and Forest		
		Red Gum (Eucalyptus tereticornis).		
Meridolum	Endangered	Primarily inhabits Cumberland Plain	High	TSC
corneovirens		community). This community is a		
		grassy, open woodland with		
Cumberland Plain		occasional dense patches of shrubs.		
Lano Shall Miniopterus	Vulnerable	Caves are the primary roosting	High to	TSC
schreibersii	Vullierable	habitat, but also use derelict mines,	Moderate	100
oceanensis		storm-water tunnels, buildings and	incuciato	
		forested areas, catching moths and		
Eastern Bentwing-bat		other flying insects above the tree		
		tops.		
Mixophyes balbus	Vulnerable	forest in the foothills and escarpment	Very Low	EPBC, ISC
Otuttoring From		on the eastern side of the Great		
Stuttering Frog		Dividing Range.		
Mixophyes iteratus	Endangered	amongst deep, damp leaf litter in	Very Low	EPBC, ISC
Cient Perrod Fred		rainforests, moist eucalypt forest and		
Giant Barred Frog		nearby dry eucalypt forest		
Mormopterus	Vulnerable	woodland east of the Great Dividing	High	ISC
nonoikensis		Range.		
Fastern Freetail-bat				
		Roost mainly in tree hollows but will		
		structures.		
Myotis adversus	Vulnerable	Generally roost in groups of 10 - 15	Moderate	TSC
		close to water in caves, mine shafts,		
Large-footed Myotis		channels, buildings, under bridges and		
		in dense foliage.		
		catching insects and small fish by		
		raking their feet across the water		
		surface.		
Neophema pulchella	Vulnerable	woodland adjoining clearings.	Moderate	TSC
Turrenting Domest		timbered ridges and creeks in		
		farmland		
Ninox connivens	Vulnerable	forest, swamp woodlands and	Moderate to	rsc
Barking Out		especially in inland areas, timber	rign	
		along watercourses. Denser		
		roosting.		
Ninox strenua	Vulnerable	The Powerful Owl inhabits a range of	High	TSC
		vegetation types, from woodland and		
Species Name	Status	Habitat Requirements / Comment	Likelihood of	Database /
---	---	---	--------------------	------------
			Occurrence	Act
Powerful Owl		forest and rainforest.		
Oxyura australis Blue-billed Duck	Vulnerable	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic	Very Low	TSC
Potourus australis	Vulnerable	Occur in tall mature eucalypt forest	Moderate to	TSC
Yellow-bellied Glider	Vullerable	generally in areas with high rainfall and nutrient rich soils.	High	150
Petaurus norfolcensis	Vulnerable	Inhabits mature or old growth Box,	Moderate to	TSC
Squirrel Glider		Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt- Bloodwood forest with heath understorey in coastal areas.	Low	
		Prefers mixed species stands with a shrub or Acacia midstorey.		
Petrogale penicillata	Vulnerable	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures	Very Low	EPBC, TSC
Brush-tailed Rock- wallaby		caves and ledges facing north.		
Phascolarctos	Vulnerable	Inhabit eucalypt woodlands and	Moderate to	TSC
cinereus		forests.	High	
Koala		Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.		
Polytelis swainsonii Superb Parrot	Vulnerable	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Moderate to Low	TSC
Potorous tridactylus tridactylus Long-nosed Potoroo	Vulnerable (EPBC Act - SE mainland)	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Low	EPBC, TSC
Pseudophryne australis	Vulnerable	Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones.	Very Low	TSC
Red-crowned Toadlet		Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings		
Pteropus poliocephalus Grey-headed Flying- fox	Vulnerable	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	High	EPBC, TSC
		Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.		
Pyrrholaemus	Vulnerable	The Speckled Warbler lives in a wide range of Eucalyptus dominated	High	TSC

Species Name	Status	Habitat Requirements / Comment	Likelihood of Occurrence	Database / Act
sagittatus Speckled Warbler		communities that have a grassy understorey, often on rocky ridges or in gullies		
Rostratula (benghalensis) australis (Australian) Painted	Vulnerable (EPBC) Endangered (TSC)	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber	Very Low	EPBC, TSC
Snipe	(100)			
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	Vulnerable	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Moderate	TSC
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	Vulnerable	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in troe hollows, it has also been found in	High to Moderate	TSC
		buildings.		
Freckled Duck	Vuinerable	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	Very Low	TSC
<i>Tyto novaehollandiae</i> Masked Owl	Vulnerable	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides.	Moderate to High	TSC
<i>Tyto tenebricosa</i> Sooty Owl	Vulnerable	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalyot forests.	Moderate	TSC
Xanthomyza phrygia Regent Honeyeater	Endangered	The species inhabits dry open forest and woodland, particularly Box- Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees high	High to Moderate	EPBC, TSC
Poforonoo: Hobitat raqui	irements ovtracted	canopy cover and abundance of mistletoes.		



Appendix E Noise and Vibration Report

BASSETT



Pitt Town Pumping Station and Rising Main Noise Assessment

Johnson Property Group 3 July 2008 Document No.: 60023107-GL001.RPT01

Noise Assessment

Prepared for

Johnson Property Group

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3 July 2008

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1.0 Introduction

1.1 Background

The Johnson Property Group proposes to construct a sewage pumping station and rising main connecting to the McGraths Hill Sewage treatment plant.

Bassett Acoustics was commissioned on behalf of Maunsell Pty Ltd, to provide a construction noise and vibration assessment report of the likely impact of the construction phase and the operation of the Pitt Town pumping station and rising main.

The scope of the noise and vibration assessment is as follows:

- Establish construction noise and vibration objectives in accordance with current legislation and guidance;
- Identification of noise sensitive receivers likely to be affected by construction noise and vibration;
- Calculation of noise and vibration levels likely to be associated with the pumping station and rising main works at noise sensitive receivers; and
- Consideration of the impacts that may result from the proposed works and, if necessary, mitigation measures to reduce adverse impacts.

In addition the potential impact on residential receivers of the operational noise associated with the pumping station has been assessed.

1.2 Construction Methodology

The proposed construction will employ trenching, loading and unloading of trucks and backfilling. It is expected that the following key equipment will be used¹:

- Excavator
- Mobile Crane
- Dump Truck
- Trenching Machine
- Directional Drill
- Compactor

1.3 Sensitive Receivers

The most sensitive residential locations are shown in Figure 1-1 and are labelled Groups 1, 2 and 3. The pumping station, the rising main and the measured locations are also shown in this figure.

¹ Information provided by Maunsell Pty Ltd

Figure 1-1 Receiver Locations



1.4 Existing Noise Environment

Noise loggers were used to measure existing ambient noise levels at the locations shown in Figure 1-1.

The equipment used for the measurements were two Rion noise loggers and one SVAN 949 sound analyser. These instruments comply with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters – Part 2: Integrating - averaging". The sound level analysers were calibrated before and after the measurements using a Bruel and Kjaer 4230 calibrator. No significant drift in calibration was observed.

A noise logger measures the noise level over the sample period and then determines L_{A1} , L_{A10} , L_{A90} , L_{Amax} and L_{Aeq} levels of the noise environment. The L_{A1} , L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample period respectively. The L_{Amax} is indicative of maximum noise levels due to individual noise events. The L_{A90} is taken as the background noise level.

The background level (ABL) is established by determining the lowest tenth-percentile level of the L_{A90} noise data acquired over each period of interest. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABLs determined over the entire monitoring duration. Graphical representations of the logged noise levels are included in Appendix B Graphical Ambient Noise Monitoring Results. The predominant noise source at the noise monitoring locations was road traffic noise.

	L _{A90} Background Noise		L _{Aeq} Ambient Noise			
Date		Levels (dB)	1		Levels (dB)	
	Day	Evening	Night	Day	Evening	Night
1 Garfield Road, McGraths Hill						
Wednesday 26 March, 2008	-	39	31	-	51	50
Thursday 27 March, 2008	41	39	29	55	54	49
Friday 28 March, 2008	41	38	27	55	51	49
Saturday 29 March, 2008	40	35	30	57	51	47
Sunday 30 March, 2008	42	38	29	55	51	50
Monday 31 March, 2008	39	40	32	54	54	50
RBL	41	39	30	55	52	49
	6 Buckrid	ge Street, Pitt	Town			
Wednesday 26 March, 2008	-	34	27	-	48	44
Thursday 27 March, 2008	37	34	25	49	50	42
Friday 28 March, 2008	36	33	23	55	46	39
Saturday 29 March, 2008	36	32	26	58	45	40
Sunday 30 March, 2008	37	34	26	47	47	44
Monday 31 March, 2008	34	34	26	47	45	43
RBL	36	34	30*	56	47	42
	75 Bootl	es Lane, Pitt T	own			
Wednesday 26 March, 2008	-	38	27	-	53	47
Thursday 27 March, 2008	38	33	25	53	53	49
Friday 28 March, 2008	38	34	25	54	54	46
Saturday 29 March, 2008	36	36	25	56	51	44
Sunday 30 March, 2008	33	34	23	55	52	46
Monday 31 March, 2008	35	32	24	53	49	47
RBL	36	34	30*	54	52	47

Table 1-1 Summary of pre-construction measured background noise levels (RBL)

* Where the RBL is found to be less than 30 dB(A) then it is set to 30 dB(A) in accordance with the Industrial Noise Policy

2.0 Noise and Vibration Criteria

2.1 Construction Noise Objectives

The NSW Department of Environment and Climate Change's (DECC) Environmental Noise Control Manual (ENCM) has been largely superseded by the NSW Industrial Noise Policy (INP) and the Noise Guidelines for Local Council (NGLC). Construction noise criteria were previously specified in the ENCM and have not been included in either of the aforementioned publications. The DECC have advised that they are currently developing new draft guidelines for managing construction noise which will adopt a "best practice" type approach that attempts to reduce construction noise to a level that is limited by what is feasible and reasonable.

The guidelines will require a construction noise management plan to be compiled by the contractor. Noise level objectives must be set for the day time and evening periods, and must be complied with where reasonably practicable. The objective levels should be identical to those found in the ENCM however the noise descriptor to be used is the L_{Aeq} , which will be approximately 3 dB(A) less than the $L_{A,10}$ levels for construction noise. During the night time period, the noise limits detailed in the Industrial Noise Policy must be met. An objective differs from a limit in that it must be complied with where feasible and reasonable, whereas a limit must be complied with unconditionally.

The noise management plan should detail the "best practice" construction methods to be used, presenting a reasonable and feasible approach. The plan should identify the extent of the residential area affected and assess the impact on residents. The plan should detail any community relation programs which are planned e.g. prior notification for particularly noisy activities, letter box drop regarding out of hours construction work to be undertaken, etc and a 24 hour contact phone number for residents to call should they have any complaints or questions.

The construction site noise section, Chapter 171 of the ENCM, is reproduced below.

Construction Site Noise:

"Where there is a likelihood of annoyance due to noise from construction sites, conditions such as the following may be specified in a development consent or building application. This applies particularly to non-scheduled premises such as commercial buildings where a long construction time is not likely. The criteria may not be applicable to long term constructions such as coal mines which may take several years. Variations should be made according to local conditions"

Level Restrictions

(i) Construction period of 4 weeks and under

The L_{10} level measured over a period of not less than 15 minutes when the construction site is in operation must not exceed the background level by more than 20 dB(A).

 (ii) Construction period greater than 4 weeks and not exceeding 26 weeks The L₁₀ level measured over a period of not less than 15 minutes when the construction site is in operation must not exceed the background level by more than 10 dB(A).

Although not specifically stated, it is understood that when the construction noise activities exceed 26 weeks, the L_{A10} level should not exceed the background level by more than 5 dB(A).

Time Restrictions

Monday to Friday, 7am to 6pm Saturday, 7am to 1pm if inaudible on residential premises, otherwise: 8am to 1pm. No construction work to take place on Sundays or Public Holidays.

Silencing

All possible steps should be taken to silence construction site equipment. It is particularly important that silenced equipment should be used on road or rail works where 24 hr operation is necessary.

The objective noise levels for construction noise recommended by Chapter 171 of the ENCM are presented in Table 2-1.

Construction Period	L _{Aeq} Daytime Objective Noise Levels dB(A)
< 4 weeks	L _{A90} + 20
4-26 weeks	L _{A90} + 10
> 26 weeks	L _{A90} + 5

Table 2-1 – Background Noise Levels

"Normal working hours" defined in the DECC's Environment Noise Control Manual are defined as:

- 7:00 am 6:00 pm Monday to Friday
- 7:00 am 1:00 pm Saturday if inaudible on residential premises, otherwise 8:00 am to 1:00 pm. No construction work to take place on Sundays or Public Holidays.

It is assumed there will be no night time construction works.

The works will continue for more than 26 weeks. However as the construction is expected to progress at approximately 60m per day no one residence will be exposed to noise associated with the construction for more than 5 days. Therefore the applicable construction noise objective will be $L_{A90} + 20 \text{ dB}(A)$. A summary of the objectives is presented in Table 2-2 below.

Note that the noise levels measured at 6 Buckridge Drive are assumed to be representative of the residential receivers along Pitt Town Road.

Table 2-2 – Construction noise objectives

Site Location	L _{Aeq} Daytime Noise Objective (L _{A90} +20 dB(A))
Group 1	61
Group 2	56
Group 3	56

2.2 Construction Vibration Objectives

Vibration has several physical characteristics; these include frequency, direction, duration, regularity and magnitude. The amplitude of vibration can be described using various measures; the displacement of a particle, the velocity of a particle and the acceleration of a particle. However, there is an increasing tendency to measure vibration in terms of the peak velocity of a particle, termed the Peak Particle Velocity (PPV), with units of millimetres per second.

Similar levels of vibration can have differing effects on structures depending on whether the vibration is continuous or transient. Buildings exhibit different responses to vibration of different durations. In the case where the vibration is at a frequency close to the fundamental natural frequency of the building structure and the vibration is sustained for long enough, dynamic magnification can occur. Dynamic magnification causes the relatively small vibration level exciting the building to be amplified greatly and should be avoided.

Human beings are known to be very sensitive to vibration, the threshold of perception being typically in the peak particle velocity range of 0.15 mm/s to 0.3 mm/s at frequencies between 8 Hz to 80 Hz. Vibrations above these values can disturb, startle, cause annoyance, or interfere with work activities. At higher levels they can be described as unpleasant or even painful. In residential properties vibrations can cause anxiety and concern about structural damage. Vibrations may also cause structure-borne noise (causing loose fittings to rattle) which can be an additional annoyance to residents.

2.2.1 Building Exposure to Vibration

DIN Standard 4150 - Part 3 - Structural Vibration in Buildings - Effects on Structures provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration. These are presented in Table 2-3 below. It should also be noted that these levels are "safe limits", up to which no damage due to vibration effects has been observed for the particular class of building. "Damage" is defined by DIN 4150 to include even minor non-structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls.

DIN 4150 states that buildings exposed to higher levels of vibration than recommended limits will not necessarily result in damage, the limits are generally recognised as being conservative.

	Vibration Velocity in mm/s (PPV)			
Type of Structure	The Measured Value of the Three Orthogonal Components Measured at the Foundation at a Frequency of		The Maximum Value Measured in the Plane of the Floor of the Uppermost Storey	
	Less than 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All Frequencies
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Table 2-3 - DIN 4150: Structural damage safe limits for building vibration

Note: For frequencies above 100 Hz, the higher values in the 50 Hz to 100 Hz column should be used.

British Standard 7385: *Part* 2 1993 *Evaluation and Measurement of Vibration in Buildings* quantifies three different levels of damage to structures:

- **Cosmetic** The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction.
- **Minor** The formation of large cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks.
- **Major** Damage to structural elements of the building, cracks in support columns, loosening of joints, splaying of masonry cracks, etc.

BS 7385 provides guidance on assessing the possibility of vibration-induced damage in buildings due to a variety of sources and sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The standard states that there is a major difference between the sensitivity of people in feeling vibration and the onset of levels of vibration which may damage the structure. The levels of vibration at which people are likely to comment are below levels of vibration which damage buildings, except at lower frequencies.

The full assessment method presented takes into account the magnitude, frequency and duration of recorded vibration together with consideration of the type of building which is exposed. Although the criteria contained within BS7385 are useful when appraising the relative severity of structural vibration, it is important to note that they are not intended to be adopted as acceptable or non-acceptable limits for vibration. The criteria in BS7385 are shown Table 2-4 below.

Type of Building	Peak component particle velocity in frequency range of predominant pulse		
	4 Hz to 15 Hz	15 Hz and above	
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above		
Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz Increasing to 50 mm/s at 40 Hz and above	

Table 2-4 - Transient vibration guide values for cosmetic damage

NOTE 1 Values referred to are at the base of the building.

NOTE 2 For unreinforced or light framed structures at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

Where the dynamic loading caused by continuous vibration results in dynamic magnification due to resonance the guide values in Table 2-4 may need to be reduced by up to 50 %, especially at the lower frequencies where lower guide values apply.

BS7385 asserts that minor damage is possible at vibration magnitudes that are greater than twice those given in Table 2-4 above, and that major damage to a building structure may occur at values greater than four times the stated values.

2.2.2 Human Exposure to Vibration

Long term exposure to vibration in buildings may cause annoyance. The levels at which annoyance occurs are much lower than the structural damage criteria in buildings.

British Standard 6472-1992 Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz) and NSW DECC publication 'Assessing Vibration – A Technical Guideline' provides guidance on human response to vibration. BS 6472 defines levels of building vibration associated with a "low probability of adverse comment" from occupants, and the applicable levels for daytime activities are presented in Table 2-5 below.

Table 2-5 - Continuous Vibration (PPV) with "Low probability of adverse comment" (1 Hz to 80 Hz)

Building Type Peak Floor Vibration		Peak Floor Vibration	
(X, Y Horizontal)		(Z Vertical)	
Residential	0.8 mm/s to 1.6 mm/s	0.3 mm/s to 0.6 mm/s	

Note: Daily monitoring can be performed with single axis instrumentation, in the z-axis (i.e. vertically). If problematic vibration levels are discovered then full tri-axial measurements should be obtained.

Vibration Dose Values (VDV) may also be used to assess the likelihood of complaints of intermittent vibration. The values and corresponding likelihood of response is presented in Table 2-6 below. The VDV should be determined from a measurement obtained over the full exposure to vibration.

Table 2-6 - Vibration Dose Values (m/s^{1.75}) and the various degrees of adverse comment expected

Location	Low Probability of	Adverse Comment	Adverse Comment
	Adverse Comment	Possible	Probable
Residential buildings 16 hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6

2.3 Environmental Noise Emissions Criteria

2.3.1 Industrial Noise Policy

The Department of Environment and Climate Changes (DECC) provides guidelines for external noise emissions from industrial premises. These guidelines for industrial noise sources are provided in the New South Wales Industrial Noise Policy (INP) and will apply to all mechanical plant installed at the pumping station.

The assessment procedure for industrial noise sources has two components:

- Controlling intrusive noise impacts in the short term for residences; and
- Maintaining noise level amenity for residences and other land uses.

Intrusive Noise Impacts

The INP states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15 minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). This is often termed the Intrusiveness Criterion.

The 'Rating Background Level' (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in the INP. Using the rating background noise level approach results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

Protecting Noise Amenity

To limit continuing increase in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.1 of the INP. That is, the ambient L_{Aeq} noise level should not exceed the level appropriate for the particular locality and land use. This is often termed the 'Background Creep' or Amenity Criterion. For a residential receiver in a suburban area the recommended criteria are shown in Table 2-7 below.

Table 2-7	Recommended	L _{Aeq} noise le	evels from in	ndustrial noi	ise sources
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Type of Receiver	Indicative Noise	Time of Day	Recommended L _{Aeq} Noise Level, dB(A)		
	Amenity Area		Acceptable	Recommended Maximum	
		Day	55	60	
Residence	Suburban	Evening	45	50	
		Night	40	45	

When the existing noise level from *industrial noise sources* is close to the "Acceptable Noise Level" (ANL) given above, noise from the new source must be controlled to preserve the amenity of the area in line with the requirements of the INP. However, industrial noise is not significant at this site therefore the amenity criteria will be as shown in Table 2-8.

2.3.2 Resultant Environmental Noise Criteria

A summary of the environmental noise criteria are given in Table 2-8. Since the proposed plant will be located near Bootles Lane the operational criteria has been determined using the RBL's measured at this location (which corresponds to Group 3).

Period	RBL (L _{A90})	Intrusive Criterion = RBL + 5	Amenity Criteria (dB(A))	Final Environmental Criteria
Bootles Ln				
Day	36	41	55	41
Evening	34	39	45	39
Night	30	35	40	35

Table 2-8 Summary of Environmental Noise Criteria, dB(A)

3.0 Construction Noise and Vibration Assessment

In determining this noise and vibration assessment the following assumptions have been made²:

- The equipment to be used in the construction phase consists of an: Excavator (approximately 20 tonnes), Mobile Crane, Dump Truck (approximately 15 tonnes), Trenching Machine (approximately 25 kW), Directional Drill and Compactor (approximately 110 kg);
- Construction activities will predominantly be undertaken during normal working hours (07.00 am 6.00 pm Monday to Friday and 8.00 am – 1.00 pm Saturday).
- Any acoustic effects of the existing site topography were excluded from the calculation;
- No noise enhancing meteorological conditions were taken into account;

3.1 Construction Noise Assessment

3.1.1 Construction Equipment Sound Levels

For the equipment to be used in the construction of the pumping station and riser, Table 3-1 below presents the typical sound power levels and the associated sound pressure levels at 7 m. These sound power and sound pressure levels are typical values taken from BS 5228 Noise and vibration control on construction and open sites. The likely stages of construction are also shown in Table 3-1

Stage	Equipment	Sound Power Levels dB(A)	Time On (%)	Sound Pressure Levels L _{A10} at 7m, dB(A)
	Excavator [*]	95	75%	70
1	Mobile Crane	110	50%	85
	Dump Truck	108	40%	83
2	Trenching Machine	105	100%	80
3	Directional Drill	110	100%	85
4	Compactor	108	80%	83
	Excavator*	95	75%	70

Table 3-1 - Description of expected construction equipment and associated L_{Aeq} Sound level

*Assumes DECC residential grade muffler in use

3.1.2 Likely Construction Noise Levels

Table 3-2 shows the predicted construction noise for each stage at various distances from the construction. The L_{A10} levels have been calculated assuming there will be a 4.5m acoustic barrier between the construction and the residential receivers. The objective noise levels are given in Table 3-3.

² Data and construction process supplied by Maunsell Pty Ltd

Distance (m)	Predicted L _{Aeq} Noise Levels, dB(A)				
	Stage 1	Stage 2	Stage 3	Stage 4	
10	60	56	61	58	
20	59	55	60	57	
50	54	50	55	52	
100	49	45	50	47	
200	43	39	44	42	

Table 3-2 - Predicted construction noise levels at various distances from the construction

Table 3-3 – Objective noise levels

Site	Objective Noise Level, L _{Aeq} Day, dB(A)
Group 1	61
Group 2	56
Group 3	55

The construction noise objectives will be exceeded at the properties closest to the construction for the residential Groups 2 and 3, assuming minimum distances of 10m and 20m respectively. However this is a worst case scenario and it is expected that the majority of houses within these groups will be further from the construction.

3.2 Construction Vibration Assessment

3.2.1 Typical Construction Equipment Vibration Levels

Table 3-4 below shows the typical worst case vibration levels expected due to the use of construction equipment. These levels will only occur for very short periods and should not exceed 2 days duration for any one property during the construction period.

Activity	Approximate Distances (m)	Typical Vibration
Compactor (Handheld)	5 m 10 m	20 mm/s <5 mm/s
Excavator	5 m	1.0 - 2.0 mm/s
Truck traffic (over normal road surfaces)	Building footings located 10 m from a roadway	0.01 mm/s - 0.2 mm/s
Truck traffic (over irregular surfaces)	Building footings located 10-20 m from a roadway	0.1 mm/s - 2.0 mm/s

Table 3-4 - Typical vibration levels caused by construction equipment

3.2.2 Likely Construction Vibration Levels

It is considered unlikely that the vibration levels will pose a risk to structurally sound buildings or cause adverse comment at the residential locations along the construction route.

4.0 Pumping Station Operational Noise Assessment

4.1 Normal Operating Conditions

The pumping station located at Pitt Town will consist of one emergency 350 kVA generator with a standard canopy enclosure (typical sound pressure level at 1 m of 85 dB(A)) and two 55kW pumps which will be mounted inside a 9 m deep concrete pit. It is understood that the pumping station will have a mains electricity supply, however the emergency generator will be utilised during power outages. The pumps will run during the day, evening and night time periods. The pumping station site is bounded by Bootles Lane to the south. During normal operation the pumping station noise will not exceed the environmental criteria as noise from the pumps will be negligible. Effects of site topography, wind and temperature changes have not been taken into account.

4.2 Emergency Operating Conditions

During power outages or testing of the emergency generators the noise level from the emergency generator is likely to be as shown in Table 4-1 at the nearest residence, approximately 80 m away. It can be seen that the environmental noise criteria are likely to be exceeded during the day, evening and night time periods, although it should be noted that testing will occur during the daytime only.

The INP allows an adjustment in the criteria of 5 dB(A) where there will be only one noise 'event' with a duration of up to one hour per 24 hour period when that 'event' occurs during the daytime and evening periods. With this allowance, exceedances of 2-3 dB(A) will still occur during the daytime and evening periods, however this is not considered significant given that the equipment will operate during power outages and tests only. The night-time criterion will be exceeded by approximately 12 dB(A) if power outages occur during the night-time period. However assuming an open window with a typical attenuation of 10 dB(A), the internal noise levels in the nearest residence are likely to be approximately 37 dB(A). This noise level is unlikely to disturb residents given that the recommended design sound level range for sleeping areas in residential areas is 30-40 dB(A).

If the emergency generator is fitted with an acoustic enclosure with an insertion loss of 12 dB(A) then all the environmental noise criteria will be met during all periods. Alternatively a concrete/blockwork noise barrier erected on the south, east and west sides of the generator will ensure all the environmental noise criteria will be met during all periods. The barrier should be 2.5 m in height, extend 2 m beyond the generator and be free from gaps. Table 4-1 provides a summary of the predicted noise levels with and without a noise barrier.

Period	Environmental Criteria	Emergency G withou	enerator Noise t Barrier	Emergency Generator Noise with Barrier	
		L _{Aeq} level dB(A)	Exceedance	L _{Aeq} level dB(A)	Exceedance
Day	41 (46*)	47	7 (2*)	35	-
Evening	39 (44*)	47	8 (3*)	35	-
Night	35	47	12	35	-

Table 4-1 Predicted noise levels at residences on Bootles Lane during a power outage.

* Additional 5 dB(A) allowed for events with a duration of up to 1 hour in any 24 hour duration

5.0 Recommendations

5.1 **Construction Noise Recommendations**

5.1.1 General Mitigation Measures

The noise level emissions from site plant and the potential annoyance to sensitive receptors will depend on the selection of equipment, the type of operation, the activity duration and the time of day it is conducted. The contractor should demonstrate best practicable means and include noise mitigation measures in the construction management plan.

Generic measures to minimise the construction noise impact are detailed below, and are given to illustrate the range of techniques available:

- Construction activities to be limited to between 7 am and 6 pm Monday to Friday and 8 am to 1 pm Saturday;
- Possible restrictions to construction hours (beyond the above hours) where noise impacts are significant;
- The contractor would be required to select and operate plant and equipment with appropriate mufflers and noise controls, and where practical, to adopt work practices which would minimise noise impacts. These measures would be implemented as part of the construction stage EMP;
- All plant items should be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
- All pneumatic tools should be fitted with silencers or mufflers;
- Minimise requirements for vehicle movements outside normal daytime working hours;
- An information programme would be developed to inform the local residents of the construction
 programme and time periods when noise levels could exceed the relevant goals. This information
 program may include letter box drops, phone calls, a website and consultation with community
 groups;
- Provide induction and training to staff and sub-contractors outlining their responsibilities with regard to noise, and;
- Noise monitoring at sensitive locations as agreed with DECC for any excessive noise or noise complaints being assessed with appropriate action taken;

The noise and vibration mitigation measures listed above will be implemented where reasonable and feasible.

5.1.2 Special Construction Noise Mitigation Measures for Residential Locations Likely to be Adversely Affected

The contractor will, where reasonable and feasible, apply best practice noise mitigation measures including:

- Select site access points and roads away from residences;
- Apply time restrictions on noisy tonal or repetitive activities;
- Provide respite periods for any activities that result in impulsive or tonal noise generation;
- Switch off equipment during break times;
- Combine noisy activities to reduce their impact and duration;
- Maximise the offset distance between noisy plant items and nearby sensitive receivers;
- Avoid the coincidence of noisy plant items and nearby noise sensitive receivers;
- Orientate equipment away from noise sensitive areas;
- Carry out loading and unloading away from noise sensitive areas;
- Use temporary barriers to screen noisy activities at sensitive receptors;

• Where variable pitch reversing alarms are fitted to plant, they will be required to be set on the lowest safe level, and where practicable, endeavour to provide drive-through facilities to minimise utilisation of reverse warning devices. The use of broad-band reversing alarms will be considered.

In order to minimise noise impacts during the construction works, construction contactors will take all reasonable and feasible measures to mitigate noise effects. Pro-active management of the works, in particular adhering to the prescribed working hours and mitigating noise impacts, and maintaining good relations with the surrounding community should ensure that the impacts are minimised.

5.2 Construction Vibration with Mitigation Measures

Prior notification to residences and investigative monitoring would be advised to prevent "adverse comment". Although vibration levels of 5 mm/s or below are unlikely to pose a risk to structurally sound properties, vibration levels above 1 mm/s can cause anxiety to residents and cause concern for their properties. Good public relations is the most practicable and effective approach to minimise complaints.

6.0 Conclusions

The likely impact of noise and vibration associated with the construction of a pumping station and rising main on sensitive residential receivers has been assessed. It is expected that the construction noise objectives will be exceeded and suitable recommendations have been given to cover all reasonable and feasible mitigation options. It is unlikely that vibration arising from the construction will pose a risk to structurally sound buildings or cause adverse comment at the residential locations along the construction route.

In addition the potential effect of the operational noise associated with a pumping station located in Pitt Town has been examined. It is likely that the environmental criteria will not be exceeded during normal operation of the pumping station. During a power outage an emergency generator will be used to power the pumps. The environmental noise criteria are likely to be exceeded during the operation of the emergency generator, however the impact of these exceedances is likely to be minimal. Nonetheless recommendations have been provided, which if implemented, will reduce emergency generator noise levels to meet the environmental noise criteria. Appendix A Terminology

The following is a brief description of the terminology used in this report.

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.				
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region of 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.				
Character, Acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.				
Decibel, dB	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds;				
	0 dB (A)	The faintest sound we can hear			
	30 dB (A)	A quiet library or in a quiet location in the country			
	45 dB (A)	Typical office space. Ambience in the city at night			
	60 dB (A)	Martin Place at lunch time			
	70 dB (A)	The sound of a passing car on the street			
	80 dB (A)	Loud music playing at home			
	90 dB (A)	The sound of a truck passing on the street			
	100 dB (A)	The sound of a rock band			
	115 dB (A)	Limit of sound permitted in industry			
	120 dB (A)	Deafening			
dB(A)	A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. Te sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is noted as dB(A). Practically all noise is measured using an "A" filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.				
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.				
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on.				
L _{max}	The maximum sou	ind pressure level measured over a given period.			
L _{min}	The minimum sour	nd pressure level measured over a given period.			
L ₁	The sound pressure level that is exceed for 1% of the time for which the given sound is measured.				
L ₁₀	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured				
L ₉₀	The sound pressure level that is exceeded for 90% of the time for which the given sound is measured. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).				
L _{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.				
Peak Particle Velocity (PPV)	A measure of ground vibration magnitude, PPV is the maximum instantaneous particle velocity at a point during a given time interval in mms ⁻¹ . Peak particle velocity can be taken as the vector sum of the three component particle velocities in mutually perpendicular directions.				

Appendix B Graphical Ambient Noise Monitoring Results

Wednesday 26 March, 2008



Thursday 27 March, 2008



















Tuesday 01 April, 2008



Wednesday 26 March, 2008



Thursday 27 March, 2008







Saturday 29 March, 2008



Saturday 29 March, 2008



Sunday 30 March, 2008 90 80 70 60 dB(A) 50 40 30 20 -9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 Time 6 Buckridge St, Pitt Town Ambient Noise Monitoring ____L1 ___L10 ____Leq ___L90





Tuesday 01 April, 2008



Wednesday 26 March, 2008



Thursday 27 March, 2008







Saturday 29 March, 2008






Monday 31 March, 2008



Tuesday 01 April, 2008



Appendix F Preliminary Aboriginal Archaeological Assessment



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Appendix F Preliminary Aboriginal Archaeological Assessment

ARCHAEOLOGICAL & HERITAGE MANAGEMENT SOLUTIONS PTY LTD

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349 Annandale Street Annandale NSW 2038 P: (02) 9555 4000 F: (02) 9555 7005

9 July 2008

Jamin Tappouras Johnson Property Group PO Box A1308 SYDNEY SOUTH, NSW 1235

Re: Preliminary Aboriginal Archaeological Assessment of the Proposed Pitt Town Sewerage Main, Pitt Town, NSW

Dear Mr Tappouras,

Introduction

This letter report presents results of a *Preliminary* Aboriginal Archaeological Assessment (PAAA) of the Proposed Pitt Town Sewerage Rising Main from McGraths Hill to Pitt Town, NSW (study area) (refer to *Figure 1*).

The study identifies potential Aboriginal archaeological issues associated with the study area and subsequent requirements for detailed assessment, investigation and/or impact mitigation works that may be required during the future development and management of the proposed pipeline.

As such, this report is **not** a formal *Aboriginal Heritage Impact Assessment (AHIA)* in accordance with NSW Department of Environment & Climate Change (DECC) Guidelines and did not include full Aboriginal community consultation, as is required for an AHIA assessment. In the event an AHIA is required in future, broader Aboriginal Community consultation will be required in accordance with the DECC (2004) *Interim Community Consultation Requirement for Applicants.*

The report does not include any historical archaeological or (non-Aboriginal) assessment.

Aims

Specific aims of the study were as follows:

- a.) Identify any known Aboriginal sites and/or objects within the subject area and assess the potential for Aboriginal sites and/or objects buried below ground surfaces;
- b) Research, review and assess secondary historical sources and archaeological reports available for the local area to identify the potential for Aboriginal sites and/or objects to be present within the study area;

- d) Identify Aboriginal heritage constraints and opportunities with regard to the future development and management of the proposed Pitt Town Rising Main and the level of any further Aboriginal heritage investigations required; and
- e) Provide a practical assessment identifying what legislative and policy requirements would apply and how best to manage any Aboriginal heritage known or likely to be present in the study area. Recommendations for management of Aboriginal heritage would be made in accordance with the statutory requirements of the *National Parks & Wildlife Act* 1974 (*NPW Act*, 1974).

Investigation Methodology

Archaeological Literature Review

Previous reports, surveys and studies in the locality were reviewed to determine the potential for archaeological sites within the study area as well as regional patterns of Aboriginal use and occupation. The DECC Aboriginal Heritage Information Management System (AHIMS) was consulted regarding known archaeological sites in the surrounding area, and to identify whether any Aboriginal sites or objects have been recorded within the study area.

Site Inspection

The study area was briefly inspected using both pedestrian and vehicular transects. The investigation assessed the degree of land disturbance and erosion in the study area to determine the likelihood of undisturbed Aboriginal sites and/or objects buried below ground surfaces.

Letter Report

This letter describes the results of the AHIMS Aboriginal sites database search, literature review, and site inspection. The report also identifies Aboriginal heritage constraints on development and management of the proposed study area. It provides recommendations about the level of further archaeological investigation that should be undertaken in advance of any future development works within the study area.



Figure 1 – **Location Plan** (area shaded purple represents approximate location of the proposed rising main with modification through Brinkley Park). *Source: Topoview 2006 Wilberforce Map Sheet*

Statutory Context

Aboriginal objects, whether known or unknown, are afforded blanket statutory protection under the *National Parks & Wildlife Act 1974*. Under Section 90 of the Act it is an offence to disturb, destroy or deface Aboriginal objects without the Consent of the DECC. If any Aboriginal sites or objects are found during development works, or at any time during a development process, excavation work would be required to cease and suitably qualified archaeologist contacted to provide further directions.

Environmental Context

The subject site is located on the *Berkshire Park* soil landscape as defined by Bannerman and Hazelton's soil landscape map for the Penrith 1:100 000 map sheet¹. The landscape is

¹ Bannerman and Hazelton, 1990.

characterised by gently undulating low rises on the terraces of the Hawkesbury River System. The geology of the landscape is the result of three depositional phases of Tertiary alluvium and/or colluvium. In the case of the rising main, it is situated upon one of the Hawkesbury River's upper terraces, although for much of its route, it is several hundred metres from the break of slope that leads down to the river and surrounding floodplains.

Soil profiles are of interest to archaeologists because it is within the natural undisturbed upper A-horizon units that archaeological deposits may be found. The soil landscape consists of sand loams to sandy clay loams, while visual observations suggest the presence of duplex or contrast-texture soils (generally comprised of shallow coarse sand topsoil overlying clay subsoil) were also frequently present with increasing distance from the Hawkesbury River. The frequency of ironstone nodules increases with depth, ultimately coming down onto weathered laterite and Wianamatta Group shales. There is no rock out cropping in the study area. The area is prone to flooding and the one in 100 year flood level in the Pitt Town area is recorded as 17.3m above AHD.

Importantly for this study is evidence of wind blown or Aeolian sands, which are commonly found on the headlands and ridge tops surrounding the Nepean River in this area. This type of deposit has exceptionally high potential for archaeological site occurrence and preservation, based on numerous studies across Australia and more locally at Fernadell (see below). Although visual observations suggest that few areas of the rising main route retain these sandy deposits, due to its location some distance from the ridgeline edges.

The majority of the original vegetation in the area has been cleared by historical processes. An assessment of the vegetation has been undertaken by Maunsell Australia Pty Limited. Only two areas revealed a presence of established trees, most likely Ironbarks, surrounding Bootles Lane, and east of Old Pitt Town Road. Historical information suggests that vegetation in the area was characterised by high alluvial levee banks that separate depressions known as 'back swamps' from freshwater riparian wetlands. Vegetation on these elevated levees consisted of Tall Open forest dominated by Forest red gum (*Eucalyptus tereticornis*) with trees typically over 30 metres in height. Understorey species would have included grasses, such as spear grass (*Stipa verticillata*) and *Microlaena*, shrub species such as Blackthorn (*Bursaria spinosa*) and *Hymenanthera dentata*, ferns including Bracken (*Pteridium esculentum*) and vines such as Sarsparilla (*Smilex spp*). Floodplains typically consisted of dense stands of Swamp Oak (*Casuarina glauca*). The site inspection suggests that much of the study area has been heavily modified and cleared in the historical and recent past. Generally, observations suggest that vegetation is currently limited to low grass cover and introduced plants such as blackberry.

The study area is in the vicinity of several water sources. These water sources include several reaches of the Hawkesbury River, within 1 to 2km of the site. The site is located 630 metres from South Creek, 700 metres from Killarney Chain of Ponds, 600 metres from the Pitt Town Lagoon, and in the general vicinity of Bardonarang Gully, Longneck Creek, Longneck Lagoon and Llewellyn Creek. Importantly for this study, the rising main is proposed to cross Horton Creek twice and McKenzies Creek, both large watercourses feeding ultimately into the Hawkesbury River.

Land clearance, ploughing and residential development are characteristic past uses of the area.

Archaeological Context

For the purposes of determining settlement and site location patterns, archaeologists examine regional and local trends in the distribution of known sites in relation to environment and topography. This provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types and locations in any given area.

Regional Context

In terms of regional archaeology, the study area falls within the greater Sydney Basin. Aboriginal occupation in this region dates back well into the Pleistocene period (i.e. before 10,000 years ago). This evidence comes from radiocarbon dates retrieved from excavated sites such as Cranebrook Terrace (41,700 years BP (before present)), Shaw's Creek K2 (14,700 years BP) and George & Charles St Parramatta (c.25,000 - 30,000 BP)². The dating of Cranebrook Terrace is currently under review³, so at this time the Charles & George St site is considered to be the oldest reliable date for Aboriginal occupation in the Sydney region. The oldest coastal site in the Sydney region is Prince of Wales Hospital (8,400 BP), closely followed by Curracurrang Rockshelter in Royal National Park (7,450 BP)⁴.

The vast majority of dated sites in the Sydney region are less than 5,000 years old (35 out of a total of 48 dated sites). It has been argued that this is a result of increased populations and 'intensification', during this period⁵. The prevalence of sites dating to the last few thousand years may also be a result of the last significant rise in sea level, approximately 2,000 years ago⁶. The sea level rise would have submerged many of the older sites along the coastal fringe.

The archaeology of the Sydney region has been well documented through a large number of academic, amateur and impact assessment investigations over the past 30 years. Approximately 4,300 sites have been recorded and registered with the NPWS (now DECC) Sites Register for Sydney⁷, reflecting both the wealth of archaeology in the region and the number of archaeological investigations undertaken.

Local Context

There have been several archaeological investigations within the Windsor and Pitt Town areas. These investigations are most notably for the flood evacuation route options⁸, Lachlan Court Retail Complex development⁹, the former Hawkesbury Hospital site¹⁰, Windsor Cemetery¹¹, and

² McDonald, 2007

³ Attenbrow, 2002:20-21

⁴ As cited in Attenbrow, 2002:18-19; Cranebrook Terrace [41 700 +3000/-2000 ANU-4016]; Shaw's Creek [14 700±250 Beta-12423]; Prince of Wales Hospital [8 400±800 lacks a lab no. from source] and Curracurrang 1 [7 450±180 Gak-482]

⁵ Hiscock & Wallis, 2005; Smith et al., 2008

⁶ Lewis et al, 2008

⁷ Attenbrow, 2002: 48

⁸ Dallas & Kelly, 1999; OzArk Environmental and Heritage Management, 2004; McIntyre-Tamwoy, 2000

⁹ JMCHM, 1998

¹⁰ Dominic Steele, 2003

¹¹ AHMS, 2006a

archaeological survey¹² and test excavations¹³ of Bona Vista and Fernadell in Pitt Town and the survey and test excavation of Hall Street, Pitt Town¹⁴. The Pitt Town investigations at Hall St, Bona Vista and Fernadell are located within 100m of the northern end of the proposed pipeline. The Windsor archaeological investigations are within 1-2 kilometres of the study area.

*Bona Vista and Fernadell, Pitt Town, NSW- Archaeological Survey (1998) and Test Excavation (2004)*¹⁵ The results of an archaeological survey for Aboriginal sites at Bona Vista and Fernadell included two open artefact scatters, two isolated artefacts, a scarred tree and the identification of areas of high archaeological potential¹⁶. Test excavations were undertaken on these areas of high potential for Aboriginal objects. 76% of the test pits contained a total of 234 stone pieces, 96 of which were stone artefacts. An ancient levee deposit running parallel to Bathurst St contained the highest density of artefacts. However it is likely this levee deposits closer to Hawkesbury River. Test pits located south east of Johnson Street contained low densities of artefacts and were characterised by a shallow sand body, moving further away from the eastern edge of the ridgeline overlooking the Hawkesbury River. Both of these locations are in the vicinity of the current study area.

Stone materials recovered from these investigations consisted of rhyolitic tuff, silcrete, quartz, quartzite, unclassified chalcedony and other volcanic stone types. The artefact size was generally small. Diagnostic elements included microliths and a possible thumbnail scraper suggesting an age of less than 4,500 years BP, although these artefacts have been found into the early Holocene (10,000 – 5,000 years BP) and late Pleistocene (>10,000 years BP). Comber interpreted that the levee was a short-term, camping and tool manufacturing site and recommended that the levee be monitored.

Hall Street, Pitt Town Archaeological Survey and Test Excavation (2005, 2006)¹⁷

An investigation was undertaken to sample the various landforms around the Hall Street area, adjacent to the Hawkesbury River. It was found that artefact densities varied across landforms. The greatest density of artefacts was recorded on the crest of the alluvial terrace and the lowest within the flood plain. The elevated alluvial terrace and terrace slopes contained a deep, stratified stone assemblage with signs of spatial patterning and alluvial, rather than Aeolian processes, were responsible for site formation and preservation of the sand terraces. The alluvial terrace and adjacent terrace slopes were found to contain a relatively intact stone artefact assemblage with some vertical integrity, preserving at least two separate phases of occupation by Aboriginal people. The lower levels contained the greatest concentration of artefacts, which was interpreted as an area of on-site reduction of artefacts and consisted of almost solely tuff which was generally amorphous. In contrast, the upper levels of the alluvial terrace contained a less pronounced concentration of artefacts. This assemblage was dominated by silcrete and quartz flaked stone pieces and was characteristic of 'Bondaian' technology. This result differs dramatically from results obtained by Comber at 'Bona Vista' and 'Fernadell'.

¹² McDonald, 1998

¹³ Comber, 2004

¹⁴ AHMS, 2005; AHMS 2006b

¹⁵Comber, 2004; AHMS, 2005, 2006b.

¹⁶ McDonald, 1998

¹⁷ AHMS, 2005, 2006b.

Comber found that the Pitt Town sand body at 'Fernadell' and 'Bona Vista' was much shallower (generally less than 1 metre deep) and that the deposit had undergone a substantial degree of vertical disturbance, which corresponds well with the results of test excavation at Hall Street. The levee described by Comber is essentially an extension of the most elevated portion of the alluvial terrace recorded at the Hall Street site. Both elevated areas contained the highest density of artefacts. To the north east of 'Bona Vista', the ground was much less elevated, sloping to the south and east towards Longneck Lagoon. A decrease in artefact density in this area corresponds with a decline in artefact density seen south towards Hall Street, away from the river. Both investigations indicate that Aboriginal people targeted more elevated areas of the Pitt Town sand body closest to the Hawkesbury River for intensive occupation and the manufacture of stone tools.

Recent Excavations in the Windsor Area.

Aboriginal sites within the Windsor area are often of low densities and generally occur in a mixture of contexts, many of them disturbed by historical and more recent human activities. However, there is also potential for large assemblages to occur within this area. For example:

- at the former Hawkesbury Hospital, Dominic Steele recovered 62 artefacts (composed of silcrete and tuff) from remnant soils located beneath historic structures¹⁸;
- the excavation of a potential archaeological deposit (PAD) for Hawkesbury Valley Way recovered 39 artefacts composed of quartz, silicified tuff and silcrete, all within a disturbed deposit¹⁹;
- excavations at Windsor Cemetery by AHMS recovered 14 flakes and 137 pieces of broken flakes from a Holocene assemblage²⁰. AHMS suggested the high breakage of artefacts related to extensive use of heat treating and splitting in this area. Artefacts were a mixture of fine grained siliceous, silcrete and tuff with less quartz, and were mainly recovered from disturbed topsoils intermixed with fill during the construction of the cemetery and nearby roads²¹; and
- the Lachlan Court Retail Complex consisted of buried topsoils underneath historical underfloor deposits. Over 1,586 stone items, of which 654 were positively identified as artefactual. The analysis of this assemblage showed evidence of extensive production of small and backed flakes, largely composed of indurated mudstone and silcrete²².

AHIMS Database Search

A search of the DECC AHIMS database²³ found 52 sites are recorded within a 2 kilometre radius around the study area. No sites have been previously recorded within the study area (refer to Figure 2).

¹⁸ Dominic Steele, 2003

¹⁹ OzArk, 2004 ²⁰ AHMS, 2006b

²¹ Ibid.

²² JMCHM, 1998

²³ Please note, that the search used was for a previous investigation in the general area, since the AHIMS search results could not be obtained from DECC in the timeframe that this report required completion.

The site types and their frequency are as follows:

- Isolated Find- 5;
- Open Artefact Scatters- 42; and
- Potential Archaeological Deposit- 5

The distribution is clearly biased by recent developments and site densities are located around Pitt Town, Mulgrave and Windsor. The only sites that are in the vicinity of the proposed Rising Main are associated with the Bona Vista and Fernadell sites discussed above. Several sites are also located toward the southern end of the proposed pipe line, but it is believed (based on other studies undertaken in the area by AHMS) that these relate to the Windsor Evacuation Route and have been erroneously recorded spatially.





ABORIGINAL, HISTORIC & INDUSTRIAL HERITAGE

Figure 2 - Topographic map showing Aboriginal sites recorded on the AHIMS database within 5km of the study area (marked purple). Source: Topoview - CMA 1:25,000 map sheets.

 ABORIGINAL, HISTORIC & INDUSTRIAL HEADTAGE

 • CONSERVATION PLANNING
 • STRUCTURAL RECORDING
 • EXCAVATION & ANALYSIS

SURVEY & ASSESSMENT

Predictive Model

Analysis of the archaeological and environmental contexts and the results of the AHIMS search generally indicate a potential for:

- Open artefact scatter sites;
- Potential archaeological deposits within intact topsoils;
- Isolated finds anywhere across the landscape;
- Potential Archaeological Deposits (PADs); and
- Midden deposits along the creekline within intact topsoils.

The regional and local studies have permitted a comprehensive model of archaeological site distribution to be developed for the Cumberland Plains. The model suggests that archaeological sites are focussed upon the higher order creeks (such as the Hawkesbury River and South Creek), situated on the surrounding river terraces, lower slopes and to a lesser extent surrounding elevated areas. Confluences of major creeks are also significant for archaeological distribution. In these areas, the soil profile is often preserved and can be in excess of 70 cm, permitting good stratigraphic and temporal retention of archaeological sites. Due to this depth of deposit, subsurface archaeological deposits are frequently found below the ground surface regardless of the presence or absence of surface archaeological evidence²⁴. Moving away from the higher order creek lines, archaeological site distribution rapidly drops in spatial extent and complexity within 150 to 200 m²⁵. The ridges and hills between the drainage lines generally exhibit only minimal archaeological evidence. JMCHM further suggest that the archaeological distribution is significantly effected by recent human activities and impacts.

While Pitt Town and McGraths Hill are technically within the Cumberland Plains, this model was designed based primarily on archaeological investigations in the Riverstone, Marsden Park, Mungerie Park and Kellyville, which has quite different morphology to the study area discussed here. In relation to the Pitt Town region, only elements of this model are likely to be true, since much of the area immediately surrounding the Hawkesbury River floods extensively and regularly. Therefore, there is likely to be a higher occurrence of archaeological sites on the surrounding ridges and hill tops than elsewhere in the Cumberland Plains (due to site survival if not actual historical occupation). Given many of these ridgelines are some distance from the river, site occurrence beyond 200 m is also likely. The presence of sandy deposits (either from alluvial deposition and/or Aeolian deposition) is also significant in determining site distribution in this region. Recent local studies at Bona Vista and Fernadell both indicated this to be the case. Hence, while the Cumberland Plain model is good generically, it does require some modification for the study area.

When considering the study area, it therefore seems likely that site distribution will be dominated by the presence of sandy pockets on elevated areas above water sources. Hence, in relation to the study area, key areas of concern include the lower slopes and hills adjacent Horton Creek and McKenzies Creek. Additional areas of interest may include some parts of

²⁴ JMCHM, 1999, 2001, 2002a, 2002b, 2005

²⁵ AMBS, 1998, 2000

Pitt Town Road, which is located on the eastern periphery of the ridgelines overlooking the Hawkesbury River and surrounding floodplain.

Importantly, studies at Bona Vista and Fernadell identified archaeological material to depths of 70 cm below the surface. Hence, consideration of buried archaeological material is also a key concern for this study. As discussed above, buried archaeological materials often occur within the sandy alluvial/Aeolian type deposits in these areas, which can be observed along some parts of Pitt Town Road (especially adjacent the proposed golf course).

Results of the Site Inspection

A site inspection of the study area was carried out on 4 July 2008 by Alan Williams and Felicity Barry (AHMS). An earlier meeting was also undertaken by Alan Williams in conjunction with Johnson Property Group and Maunsell Australia Pty Ltd on the 1 July 2008 to discuss two areas of key concern in relation to ecology (and in many respects archaeology as well). Coverage of the study area was designed to identify areas of potential archaeological sensitivity as well as areas where previous development had occurred.

The site inspection investigated the entire route of the proposed Rising Main, with specific reference to the crossings at Horton Creek and McKenzie Creek. In general, the site investigation revealed that the entire route has been extensively impacted by previous activities, including the development of residential and commercial structures, the installation of Cattai, Glebe and Pitt Town roads, and the canalisation of Horton Creek in some areas.

The proposed pipe-line route runs for most of its length in the road verges of several of the main roads between Pitt Town and McGraths Hill, including Bathurst Street, Pitt Town Road, Windsor Road, Cattai Road, and Mulgrave Road. Hence, in most areas, the soil profile has been extensively modified and truncated by the construction of these roads, as well as the development of local and private drainage systems within the road verges. There are several areas where cutting and battering for these roads is evident, and in most cases this was observed to be in excess of 70 cm, which is the maximum depth that archaeological material has been found in this area. Other services, including a high pressure gas main and Telstra cables, were also noted running adjacent to the Pitt Town Road, and are likely to have caused disturbance in these areas to significant depths (3-4m below current ground level).

Other developments, such as the golf course (currently under construction) and nearby residential activities have also impacted any potential archaeological deposits that may have been present along the proposed pipe-line in some areas.

While the investigation did reveal numerous areas along Pitt Town Road that appeared to retain sandy deposits, they were all significantly impacted or truncated by modern activities. The remaining areas investigated were characterised by shallow or truncated duplex soils – an example of this being the area encompassing, and north of, Wellesley Road, which was initially thought to have archaeological interest, but which revealed an absence of *in situ* topsoil – the soil unit from which archaeological material is usually recovered - in most areas.

In relation to the creek crossings, Horton Creek has been heavily modified near Old Pitt Town Road. There is clear evidence of canalisation, as well as development along both edges of the creek, and hence the area retains no archaeological potential. Similar findings were made for McKenzie Creek, where there is considerable evidence of flooding adjacent to the creek, and extensive drainage and residential development on the surrounding hill and ridge tops. These areas are mot likely to contain archaeological sites. It should be noted in both cases, the pipeline is proposed to cross the creeks within areas of existing impact, i.e. immediately adjacent to the current road bridge crossings.

The proposed southernmost crossing of Horton Creek from Wellesley Road to Glebe Road, where the proposed pipe line route crosses an intact lower slope to the north of the creek, was identified as being of archaeological interest. This area appeared to retain some integrity, and revealed only limited evidence of disturbance (based on visual inspection from Bathurst Street), although aerial photography does suggest at least one linear service running through it (*Figure* 3). Following known site distribution models (as outlined above), this lower slope does have moderate potential for archaeological materials to occur.



Figure 3 – Aerial photography of the proposed Horton Creek Crossing showing existing disturbance. Note the linear dis-colourations highlighted in the black box, indicative of underground services in the vicinity of the proposed rising main route. *Source: Google Earth.*

Extensive discussions have been undertaken between AHMS and Johnson Property Group in relation to this area north of Horton Creek. Given the timeframes of the project, the existing disturbance of the lower slope (in conjunction with the general absence of archaeological finds in the immediate area) and the proposed under-boring of the creek from some distance north of the lower slope, it is determined that this area, while of archaeological interest, requires no further investigation (since no impact is proposed) as part of this project. However, recommendations do require that the area is avoided by the construction team during the rising main's installation.

The southern side of Horton Creek has been completely destroyed by a small car-parking area adjacent to Glebe Road.

Exposure and visibility on the survey was generally good. While grass and low lying vegetation was extensive in several areas, evidence of existing disturbances could be readily identified along all parts of the proposed pipe-line route.

Aboriginal Archaeological Constraints

No Aboriginal sites were identified during the site inspection, but the potential for sub-surface archaeological material is considered moderate in one area north of Horton Creek. Our assessment of archaeological constraints presented below is based on conclusions about archaeological potential drawn from our understanding of local archaeological patterns and our assessment of landscape and prior land use disturbance.

We have only identified one area as having moderate potential to retain archaeological deposits. The remainder of the proposed pipeline route is considered to be heavily disturbed and truncated by a variety of construction and drainage activities, and hence is considered of negligible archaeological potential.

Moderate Archaeological Potential (shaded orange on Figure 4)

One area of the proposed pipeline route, adjacent and directly north of Horton Creek near the corner of Pitt Town Road and Glebe Street), has been identified as having moderate archaeological potential. However, discussions with Johnson Property Group have indicated that this area will be under-bored from a location upslope to the opposite side of the creek, and hence this area is unlikely to be impacted (see discussion above).

Should this area require impact by the development, an investigation into the presence or absence of archaeological deposits in this area would be required through excavation. To undertake such excavations, a permit will be required from the DECC in accordance with section 87 and/or 90 of the *National Parks and Wildlife Act, 1974*. To obtain such permits, an AHIA undertaken in accordance with the DECC (2004) *Interim Community Consultation Requirements for Applicants* would be required. The process to undertake an AHIA, and obtain

any necessary permits from DECC (assuming both a section 87 and 90 permits are needed) could take up to six months²⁶.

Please note under the provisions of the *National Parks and Wildlife Act, 1974* a Section 90 *Aboriginal Heritage Impact Permit* (AHIP) would be required from DECC prior to any disturbance of a potential archaeological deposit.



Figure 4 – Aerial photography of the proposed Horton Creek Crossing showing areas of moderate archaeological potential (highlighted in red). *Source: Google Earth.*

Negligible Archaeological Potential (all areas of pipeline except those presented in *Figure 4*)

No further work is recommended on Aboriginal archaeological grounds in all areas proposed for the pipe-line route excluding those identified as of moderate archaeological potential above. These areas are considered to have been extensively impacted through modern residential, infrastructure and general construction activities, and hence the presence of intact archaeological deposits is unlikely.

Recommendations

The following recommendations are based upon:

²⁶ This timeframe is based on a typically AHIA, which takes about four to six weeks to develop in accordance with DECC guidelines. It further includes an eight week processing time by DECC for each of the two permits, and a broad estimation of reporting and excavation time for the project in question.

- the legal requirements of the National Parks and Wildlife Act of 1974, in conjunction with;
- the results of the preliminary archaeological investigation documented in this letter.

It is recommended that:

- 1. The zone of moderate archaeological potential (*Figure 4*) are to be avoided during the construction of the rising main through the installation of temporary fencing to the area north of Horton Creek (near the corner of Bathurst Street and Glebe Road) to ensure no direct or indirect impacts (such as truck parking or turning) occur during the construction activities. If works requiring excavation are proposed in the zone of moderate archaeological potential (shaded red in *Figure 4*), an *AHIA* will be required. The AHIA should seek to fulfil the DECC's (1997) *Aboriginal Cultural Heritage Standards and Guidelines Kit* and (2004) *Interim Community Consultation Requirements for Applicants* to enable prompt application for the necessary excavation and impact permits, rather than to re-investigate the findings presented here;
- 2. No further action, insofar as Aboriginal heritage is concerned, is required within the remainder of the proposed rising main with the exception of the area identified as having moderate potential in *Figure 4*; and
- 3. Please note: it is an offence under *Section 90* of the *National Parks & Wildlife Act 1974* to disturb, destroy or deface Aboriginal objects without the Consent of the DECC. If any Aboriginal sites or objects are found during the course of development works within the subject land, excavation work in that area must cease immediately. If the Aboriginal object(s) cannot be avoided by development works (i.e. through re-design), a *Section 90 AHIP* from DECC will be required before work can recommence.

Please don't hesitate to contact Alan Williams on 02 9555 4000 if you wish to discuss these matters further.

Yours sincerely,

Alan Williams Senior Archaeologist

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ATTACHMENT F15

Regulatory Legal Compliance Policy Statement



Water Factory Company Regulatory/Legal Compliance Policy Statement

Water Factory Company Pty Ltd (**WFC**) operates within an environment of complex, legal and regulatory obligations, both specific to its core business of sewage treatment and recycled water supply, and non-specific in terms of general laws and regulations affecting businesses generally. WFC is committed to conducting all its business operations (directly and through its operating subsidiaries) in full compliance with all relevant laws and regulations (including the spirit), and to ensuring that all WFC personnel understand its compliance requirements.

Compliance Risk Management System

WFC will:

- consult with specialist compliance advisors and other market participants to implement an appropriate compliance risk management system;
- continually monitor market and regulatory developments to ensure currency of its compliance risk management system;
- establish a culture that values and supports compliance and regulatory awareness through training, development and positive executive leadership;
- set and monitor performance against meaningful objectives and measures for compliance;
- be proactive in monitoring operations to detect possible legal/regulatory breaches, and implement appropriate rectification/remedial responses;
- engage with key compliance stakeholders to ensure strong co-operative relationships;
- · encourage behaviour that supports and produces compliant outcomes; and

• benchmark its compliance risk management system against market participants to promote best-of-practice outcomes.

Responsibility

WFC will promote a culture where:

- all personnel are aware of their compliance responsibilities and recognise the same as an integral part of their responsibilities in performing their duties;
- all personnel are accountable for compliance and for monitoring the compliance of others, as well as reporting non-compliance;
- executive management will provide visible leadership and appropriate resources, and ensure that efficient and effective compliance procedures and controls are implemented in their respective areas of responsibility.

General

Every WFC director, executive, and non-executive employee, as well as contractors, advisers, and agents that act on behalf of WFC (and any of its operating subsidiaries), take all reasonable steps to avoid breaches of this policy and relevant laws and obligations. In order to mitigate against unknown potential breaches, executives are encouraged to seek professional advice from appropriate experts to ensure no inadvertent compliance breaches. Further, where there is doubt about the appropriateness of any action or inaction, personnel are encouraged to discuss the same with their immediate manager and, if doubt or concern remains as a result of such manager's decision, then personnel are encouraged to escalate the same to the Managing Director for consideration.

The WFC Board recognises the importance of compliance in the operation of WFC's business, and the criticality of an appropriate compliance risk management system to promote compliance.

Terence Leckie Managing Director March 2010



ATTACHMENT F17

Quality Assurance Certificates

F17 QUALITY ASSURANCE CERTIFICATES- Mono Pumps (Australia) Pty Ltd



CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Mono Pumps (Australia) Pty Ltd Mordialloc, Victoria Australia

has been approved by Lloyd's Register Quality Assurance Limited to the following Quality Management System Standards:

AS/NZS ISO 9001:2008

The Quality Management System is applicable to:

Design, development, manufacture, assembly, repair and service of progressive cavity positive displacement pumps and spare parts. Design and supply of integrated drive arrangements and ancillary plant. Stockholding of pumps, spare parts, selected alternate pump types, disintegration and screening equipment.

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Approval Certificate No: MEL0924555 Original Approval: 5 October 1993 Current Certificate: 8 December 2009 Certificate Expiry: 28 February 2012

MELISSA HARTLE

Issued by: Lloyd's Register Quality Assurance Limited



This document is subject to the provision on the reverse 71 Fenchurch Street, London EC3M 4BS United Kingdom. Registration number 1879370 This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA. The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001 To confirm the validity of the accreditation for this certificate please visit <u>www.jas-anz.com.au/register</u>



CERTIFICATE SCHEDULE

Mono Pumps (Australia) Pty Ltd Mordialloc, Victoria Australia

Locations

Activities

National sales, design, purchasing, manufacture, assembly.

Regional sales, service, distribution.

Regional sales, service, distribution.

Regional sales, service, distribution.

Regional sales, service, distribution.

Branch sales, service, distribution.

Branch sales, service, distribution.

Branch sales, service, distribution.

Original Approval:	5 October 1993
Current Certificate:	8 December 2009
Certificate Expiry:	28 February 2012
Page 1 of 1	

Approval Certificate No: MEL0924555 This document is subject to the provision on the reverse 71 Fenchurch Street, London EC3M 4BS United Kingdom. Registration number 1879370 This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA. The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001 To confirm the validity of the accreditation for this certificate please visit <u>www.jas-anz.com.au/register</u>

Head Office Mordialloc, Victoria

Braeside, Victoria

Kirrawee, New South Wales

Kedron, Queensland

Redcliff, Western Australia

Kalgoorlie, Western Australia

Adelaide, South Australia

Darwin, Northern Territory

Approval Certificate No: MEL0924555



F17 QUALITY ASSURANCE CERTIFICATES

- GE Betz Pty Ltd



CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

GE Betz Pty Ltd trading as GE Water & Process Technologies Ingleburn, New South Wales Australia

has been approved by Lloyd's Register Quality Assurance Limited to the following Quality Management System Standards:

AS/NZS ISO 9001:2008

The Quality Management System is applicable to:

Manufacture of chemicals and distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water and process treatment applications. Design and engineering of water and process treatment plants.

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

This certificate forms part of the approval identified by certificate number MEL 1000096

Approval Certificate No: MEL 1000096/A Original Approval: 4 July 2000

Current Certificate: 5 March 2009

Certificate Expiry: 28 February 2012

Diane Haw

Issued by: Lloyd's Register Quality Assurance Limited



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CERTIFICATE SCHEDULE

GE Betz Pty Ltd Trading as GE Water & Process Technologies Ingleburn, New South Wales Australia

Locations

Activities

Ingleburn, New South Wales	Manufacture of chemicals and distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water and process treatment applications.		
North Sydney, New South Wales	Design and engineering of water and process treatment plants. Distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water and process treatment applications.		
Fishermans Bend, Victoria	Distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water process treatment applications.		
Approval	Original Approval: 4 July 2000		

Approval Certificate No: MEL 1000096/A Original Approval: 4 July 2000 Current Certificate: 5 March 2009 Certificate Expiry: 28 February 2012



Page 1 of 2

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CERTIFICATE SCHEDULE

GE Betz Pty Ltd Trading as GE Water & Process Technologies Ingleburn, New South Wales Australia

Locations

Activities

East Perth, Western Australia	Distribution of cher and process treatm services, operation applications.	nicals, equipment and ent. Provision of techr and support for water	consumables for water nical and engineering and process treatment
Lytton, Queensland	Distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water and process treatment applications.		
New Plymouth, New Zealand	Distribution of chemicals, equipment and consumables for water and process treatment. Provision of technical and engineering services, operation and support for water and process treatment applications.		
Approval	000006/4	Original Approval:	4 July 2000
	000090/A	Current Certificate:	5 March 2009

Certificate Expiry: 28 February 2012



Page 2 of 2

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