Annual Environmental Review Report

(Reporting Period 1st April 2019 to 31st March 2020)

TAMAR VALLEY POWER STATION

PREPARED FOR
AETV POWER PTY LTD

Project No: 2946.019

FINAL Revision 2

22 December 2020

DOCUMENT ISSUE AUTHORISATION

PROJECT: Tamar Valley Power Station Annual Environmental Review Report 2018/19

PROJECT NO: 2946.019

AUTHOR: Catherine Ford (BAgSc)

PEER REVIEW: Carly Clark (BSc), CenvP, CenvP SC

DATE	PURPOSE OF ISSUE/NATURE OF REVISION	REV	ISSUE AUTHORISED BY	TO BE REVIEWED BY
5/06/2020	Draft for COVA internal review	0	Catherine Ford (COVA)	Carly Clark (COVA)
12/06/2020	Draft for preliminary AETV review	1	Catherine Ford (COVA)	Kathy Shanley (COVA)
11/08/2020	Final for Hydro COO signing and submission to EPA	Final	Kathy Shanley (COVA)	-
16/9/2020	Final for Hydro COO signing and submission to EPA	Final Rev1	Catherine Ford (COVA)	-
22/12/2020	Final for Hydro GM A&I signing and submission to EPA	Final Rev2	Chris Morrison (COVA)	-

COVA Thinking Pty Ltd

ACN 117 492 814 ABN 24 117 492 814

Telephone: (03) 6212 4400

Email: hobart@covathinking.com

FOREWORD

The Tamar Valley Power Station (TVPS) is situated at Bell Bay on land adjacent to the Tamar Estuary in northern Tasmania. The TVPS is owned by Hydro Tasmania and operated by AETV Power Pty Ltd (AETV) since it came into full operation on 19 September 2009.

The TVPS is operated in accordance with the requirements of Environment Protection Notice (EPN) No. 7898/1 which was finalised and formally issued by the Environment Protection Authority Tasmania on 20 November 2012.

AETV has submitted an Annual Environmental Review (AER) report for the TVPS to the Environment Protection Authority (EPA) every year (as required by Condition RP1 of the EPN), commencing in 2010.

This AER report has been prepared by COVA Thinking Pty Ltd (COVA) on behalf of AETV for the reporting period of 1 April 2019 to 31 March 2020 to provide:

- Description of environmental monitoring results;
- Synopsis of environmental performance; and
- Discussion of compliance with the conditions of EPN 7898/1 (and applicable amendments issued to the EPN).

AETV is committed to operating the TVPS in an environmentally conscious manner, implementing additional precautionary measures as it deems necessary to improve internal management of environmental issues.

AETV's ability to undertake some aspects of monitoring during the final month of the reporting period (March 2020) was impacted by COVID-19 pandemic restrictions.

AETV is a wholly owned subsidiary of Hydro Tasmania (Hydro).

Hydro and AETV are currently reviewing operational and management procedures for the TVPS to improve integration of the TVPS with Hydro's management systems.

Hydro's Executive General Manager, Assets and Infrastructure (GM A&I) acknowledges the contents of this AER.

Hydro GM A&I Signature: 

Hydro GM A&I Name: Mr Jesse Clarke

Date: 24th December 2020.

ENVIRONMENTAL PERFORMANCE OVERVIEW

AETV operated the TVPS at Bell Bay in an environmentally conscious manner during the 2019/20 AER reporting period to meet, and where possible exceed, the requirements of EPN 7898/1 and AETV's commitments from the previous AER.

The environmental performance of the TVPS during the past twelve (12) month reporting period (1 April 2019 to 31st March 2020) is outlined in this AER report. In brief:

Power generation

- Power generation equipment at the TVPS has been operated intermittently as needed, with prioritisation of the State power supply by hydro generation operations;
  - Unit 201 was in lay-up (along with the associated cooling towers) for most of the reporting period; and
  - Unit 104 and the FT8s (U101, U102 and U103) were only operated for short periods, as required to meet power capacity demands.

Wastewater treatment and discharge flows (DP1)

- Wastewater flows through the wastewater retention pond (WWRP) and resultant discharge from DP1 were significantly reduced across most months of the reporting period due to Unit 201 and associated cooling towers (CT) being offline.
- Low water throughput and installation of a suspended solids boom near the WWRP outlet improved the ability of the WWRP to maintain acceptable suspended solids (SS) levels when operating on untreated Curries River Dam water.
- Manual operation of the WWRP outlet valve continued to be required to manage pH, dissolved oxygen (DO) and biological oxygen demand (BOD) levels within the pond.
- The manual closure of the WWRP outlet valve allows manual sodium hypochlorite dosing to bring out-of-specification water quality back within acceptable limits (the increased height of retained water level within the WWRP is noted to have resulted in false flow readings being recorded by the v-notch weir under this atypical operation).
- The water quality of treated wastewater released via the authorised outfall to Donovans Bay (DB), Discharged Point (DP1), was within acceptable limits when the TVPS was operated under normal load conditions, with the exception of three non-compliances.

Stormwater discharge (DP2)

- The water quality of treated stormwater released via the authorised outfall to DB, Discharge Point (DP2), was managed within acceptable limits with the exception of one isolated event where hydrocarbons (thought to have been entrained in runoff from the nearby highway) were detected.

Donovans Bay and near shore water quality

- Monthly and quarterly water quality results for the receiving environment of DB show no adverse impacts and concentrations of monitored parameters continued to be comparable to that of the marine-estuarine environment of the Tamar Estuary and Esk River (TEER) for most parameters.
- The low DP1 discharge flows, numerous periods when discharge was not occurring and comparison of voluntary monthly near shore (NS) and statutory

quarterly DB monitoring results has allowed for clearer observation of natural processes within the Bay. Review of these monitoring results suggest that intermittent localised accumulation of nutrients may be occurring in the shallows in some locations within the Bay (M1 and M3) due to tidal influences and/or natural biological breakdown of organic material in sediments, rather than direct inputs from TVPS discharges from DP1 and DP2.

- The general health of DB as measured by Chlorophyll-a is noted to be predominantly below detection levels, suggesting that the level of nutrients present is not supporting algal growth and adversely impacting on water quality within the Bay. AETV will continue to monitor nutrient levels within DB to better understand this situation.

Stack emissions

- Quarterly monitoring of oxides of nitrogen (NOx) levels in air emissions from power generation equipment stacks were within acceptable limits when operated under normal load conditions.
- While every effort was made to schedule and undertake stack testing of all equipment that was operated during each quarter, the prioritisation of other hydro power stations made it difficult to predict the duration and timing of intermittent operation of power generating equipment on the TVPS site to enable specialist consultants to attend at a suitable times. Further to this, social distancing restrictions associated with the COVID-19 pandemic during March 2019 prevented attendance of specialist interstate consultants attending the site to complete testing work.

Noise controls

- Noise emissions associated with the TVPS continued to be appropriately managed with measurements at nearby noise sensitive receptors within acceptable levels.
- A scheduled follow-up annual environmental noise survey had to be postponed due to COVID-19 restrictions.

Solid and liquid waste management

- Notable reductions in some solid and liquid wastes from the previous twelve-month reporting period related to the 2019 maintenance shut being a normal one, rather than the previous major maintenance shut involving significant additional personnel being required to work on-site and extra packaging materials requiring disposal.
- Additional waste management measures are being implemented as the TVPS site moves to adopt Hydro's zero waste to landfill target.

CONTENTS

TABLES

FIGURES

PLATES

APPENDICES

ABBREVIATIONS

1mA	One metre above the seafloor
1mB	One metre below the surface
AER	Annual Environmental Review
AETV	AETV Power Pty Ltd
ANZECC	Australian New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BBPS	Bell Bay Power Station
BOD	Biochemical Oxygen Demand
CCGT	Combined-Cycle Gas Turbine
COD	Chemical Oxygen Demand
COO	Chief Operating Officer
COVA	COVA Thinking Pty Ltd (formerly SEMF Pty Ltd)
CT	Cooling Tower
D1–D4	DB WQ monitoring locations (D1 to D4)
dBA	A-Weighted Decibels
DB	Donovans Bay
^0C	Degrees Celsius
DO	Dissolved Oxygen
DP1	Discharge Point No.1
DP2	Discharge Point No.2
EA	Environmental Approval
EMS	Environmental Management System
EPA	Environment Protection Authority (Tasmania)
EPN	Environment Protection Notice No. 7898/1 - AETV Bell Bay operation
FT8s	Pratt and Whitney turbines
GJ	Giga Joules
hrs	Hours
Hz	Hertz
I1	Inline monitoring point at WWRP outlet
I2	Inline monitoring point on the discharge sump flume
IBC	Intermediate Bulk Container
kL/hr	Kilolitres per hour
L	Litres
LA_{eq}	A-weighted equivalent sound pressure
Ltn	Launceston
M1–M4	Near shore water quality monitoring locations (M1, M2, M3, M4)
m	Metres
m^3	Cubic metres
m^3/hr	Cubic metres per hour
mg/L	Milligrams per litre
mg/m^3	Milligrams per cubic metre
ML	Mega litres
ML/yr	Mega litres per year
N/A	Not Applicable
NATA	National Association of Testing Authorities
NS	Near Shore
NOx	Nitrous Oxides
NO_2	Nitrous Dioxide
NRM North	Natural Resource Management in Northern Tasmania
NTU	Nephelometric Turbidity Units
O_2	Oxygen
OCGT	Open Cycle Gas Turbine (Pratt & Whitney and Rolls Royce Trent)
PCBs	Polychlorinated Biphenyls
pH	Potential of hydrogen: measure of acidity and alkalinity
SCADA	Supervisory Control and Data Acquisition
SEMF	SEMF Pty Ltd (Now COVA Thinking Pty Ltd)
SS	Suspended Solids
SW	Stormwater
T	Tonnes
TCLP	Toxicity Characteristic Leaching Procedure
TEER	Tamar Estuary and Esk Rivers
T/Hr	Tonnes per Hour
THMs	Trihalomethanes
TN	Total Nitrogen
TP	Total Phosphorus
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTB	Ti-Tree Bend wastewater treatment facility
TVPS	Tamar Valley Power Station
UV	Ultraviolet
WQ	Water Quality
WWRP	Wastewater Retention Pond
WW	Wastewater

1. INTRODUCTION

1.1 THE TVPS

The TVPS is located at 4055 East Tamar Highway at Bell Bay in northern Tasmania and is operated by AETV Power Pty Ltd (AETV). AETV is a wholly owned subsidiary of Hydro Tasmania.

Under Schedule 2 of the *Environment Protection and Pollution Control* Act 1993, the TVPS is regulated as a level 2 *Fuel Burning* activity and is required to operate in accordance with the requirements of EPN No. 7898/1. A copy of the EPN, issued by the EPA (EPA, 2012a) is provided in Appendix A.

1.2 SCOPE AND OBJECTIVES OF THE AER

This AER has been prepared in accordance with the requirements of Condition RP1 of the EPN, with a signed copy submitted to the Director of the EPA and the document made publicly available.

The objective of the AER is to provide an overview of the environmental management, monitoring and performance of the TVPS during the previous twelve (12) month reporting period from 1 April 2019 to 31 March 2020, in relation to:

- Discharge of treated emissions (wastewater, stormwater and stack);
- Compliance of emissions within EPN limits and guideline levels;
- Monitoring of potential impacts of discharged emissions on the receiving environment; and
- Identification of areas for improvement where potential impact or non-compliance are known or possible.

1.3 STRUCTURE AND TIMING OF THE AER

The AER sections are structured to address elements of Condition RP1 of EPN 7898/1. These elements are referenced as subsection numbers for the condition in Table 1.

A change in the submission date for the AER to 30 September annually was approved by the Director of the EPA on 26 March 2018.

1.4 ACKNOWLEDGMENTS

COVA gratefully acknowledges that AETV staff have aided in compiling significant amounts of input information for this AER.

Table 1: Location of EPN Condition RP1 related information within the AER

RP1	SUMMARY OF EPN REQUIREMENT	LOCATION WITHIN THIS AER
1.0	▪ A publicly available AER for the activity must be submitted to the Director by the new date of 30 September annually (Approved by Director of the EPA on 26 March 2018).	▪ (The AER in general)
1.1	▪ A statement by the General Manager or Chief Executive Officer, acknowledging the contents of the current AER. AETV's Chief Operating Officer assumes this responsibility.	▪ Foreword
1.2	▪ A listing of any complaints received from the public during the reporting period and any actions that have resulted.	▪ Section 2.1
1.3	▪ A listing of environmental incidents and non-compliance with EPN conditions that occurred during the reporting period, with details of any mitigation or preventative actions implemented in response.	▪ Section 2.2 ▪ Table 2
1.4	▪ A summary of any environment related procedural or process changes that have been implemented during the reporting period.	▪ Section 3
1.5	▪ A summary of the monitoring data required by the Director. ▪ Presentation of data in graphical form where possible, including comparison with the historical results. ▪ Mention any special causes and system changes that have impacted on the parameters monitored. ▪ Explanation of significant deviations between actual results and any predictions made in previous reports.	▪ Section 6 ▪ Appendices E 1-5 Stack emissions ▪ Appendix F Noise ▪ Appendix G 1-6 Water quality
1.6	▪ Inclusion of a summary of fulfilment of environmental commitments made for the reporting period, with an indication of results of the actions implemented and explanation of any failures to achieve such commitments.	▪ Section 8 ▪ Table 15
1.7	▪ A summary of the amounts (tonnes or litres) of both solid and liquid wastes produced and treatment methods implemented during the reporting period. ▪ Detail any initiatives or programs planned to avoid, minimise, re-use or recycle wastes over the next reporting period.	▪ Section 5.3 ▪ Table 9
1.8	▪ A copy of AETV's most recent *Emergency Response and Contingency Plan.*	▪ Appendix B

2. COMPLAINTS, INCIDENTS AND NON-COMPLIANCE EVENTS

2.1 COMPLAINTS AND REPORTABLE INCIDENTS

No formal complaints were received by AETV from the public during the reporting period relating to the operation of the TVPS.

AETV reported five discharge water quality related events (as outlined in Section 2.2) to the EPA during the reporting period, and one hydrocarbon spill to ground as outlined in Section 3.5.

No other reportable incidents were recorded by the EPA.

One complaint was received by the EPA regarding nuisance noise in the Bell Bay area on the nights of 13 and 14 April 2019. Based on the findings of EPA and AETV investigation (including review of AETV records relating to the timing of operation for power generating equipment, and continuous site noise monitoring, plus EPA considerations of other operation in the area) it was ascertained that the noise was unlikely to have been generated by the TVPS. No further action was required.

2.2 ENVIRONMENTAL NON-COMPLIANCE EVENTS

No significant, reportable environmental incidents occurred on-site during the reporting period.

Five discharge events under normal operating conditions during the reporting period were found to have been non-compliant with prescribed EPN discharge limits as recorded for monthly samples of water discharged from DP1 (shown as orange text in Table 2).

These non-compliance events:

- Occurred due to difficulty maintaining suitable water quality when operating the WWRP under low flow conditions for prolonged periods;
- Were observed to have out of specification pH, dissolved oxygen (DO) and biological oxygen demand (BOD); and
- Were most evident during warmer periods, when the shallow pond is under low throughput and conditions support algal proliferation.

A summary of the non-compliance events during the AER reporting period is provided in Table 2, including both the:

- Monthly grab discharge sample result collected at DP1 (which is a true non-compliance and is reported to the EPA); and
- Non-compliant daily average inline results which are collected for internal management purpose to identify potential for non-compliance to occur at DP1 on days when monthly monitoring is not undertaken, or as supporting information when it is undertaken.

These inline results flag the need for implementation of manual management measures to mitigate and correct out-of-specification water quality, i.e. closure of the WWRP outlet valve.

Table 2: Summary of monthly reportable (and daily average inline) non-compliance events during 2019/20

DATE	MONITORING FREQUENCY	NON-COMPLIANT RESULT	EPN LIMIT	NON-COMPLIANCE EVENT DESCRIPTION AND ACTION
28 May 2019	DP1 Monthly	Ammonia-Nitrogen 0.98 mg/L	0.5 mg/L	▪ This DP1 discharge result was likely to have been associated with low flow conditions in the WWRP and the possible influence of cleaning agents used when taking Unit 201 and associated cooling towers (CTs) offline in the preceding week.
11 October 2019	I2 Daily Average Inline	pH 8.93 pH units	6.5-8.5 pH units	▪ These three successive days of non-compliant alkaline pH were recorded during a difficult period when trying to re-establish and maintain a suitable pH under low flow conditions (Unit 201 offline) upon refilling the WWRP (after desludging maintenance work in September 2019). ▪ Rectification of the pH was not possible, so the WWRP outlet valve was closed on 14h October 2019, and the pond dosed with sodium hypochlorite. The WWRP was managed in this manner for 8 days until acceptable water quality was achieved.
12 October 2019	I2 Daily Average Inline	pH 9.09 pH units	6.5-8.5 pH units	
13t October 2019	I2 Daily Average Inline	pH 9.18 pH units	6.5-8.5 pH units	
12 November 2019	DP1 Monthly	BOD 6 mg/L	5 mg/L	▪ As per normal procedural response to this type of situation under low flow conditions, AETV closed the outlet valves on the WWRP and dosed the pond with sodium hypochlorite to return BOD to within acceptable levels. ▪ Investigation of the incident ascertained that: - Concentrations of nutrients analysed for in the sample were within acceptable limits (i.e. there were no known notable nutrient inputs to support the algal growth); and - The prevailing low flow conditions and sunnier weather was thought to have been conducive for algal growth.

DATE	MONITORING FREQUENCY	NON-COMPLIANT RESULT	EPN LIMIT	NON-COMPLIANCE EVENT DESCRIPTION AND ACTION
18 November 2019	I2 Daily Average Inline	pH 8.52 pH units	6.5-8.5 pH units	▪ After these two days where pH was unable to be corrected under the prevailing low flow conditions (Unit 201 offline), the WWRP outlet valve was closed from 20 to 26 November (7 days) until acceptable water quality was achieved.
19 November 2019	I2 Daily Average Inline	pH 8.62 pH units	6.5-8.5 pH units	
10 February 2020	I2 Daily Average Inline	pH 8.52 pH units	6.5-8.5 pH units	▪ After these two days where average daily inline average pH was unable to be corrected under the prevailing low flow conditions (with Unit 201 and the peaking plant being offline), the WWRP outlet valve was closed on 20 November 2019 to enable hypochlorite dosing. It was kept closed for 7 days until acceptable water quality was achieved.
11 February 2020	I2 Daily Average Inline	pH 8.54 pH units	6.5-8.5 pH units	
	DP1 Monthly	pH 8.60 pH units	6.5-8.5 pH units	
11 February 2020	DP2 Monthly	TPH 670 mg/L	500 mg/L	▪ Rainfall on the day of stormwater (SW) sampling (0.6 mm) allowed for collection of a sample of the minimal flow at DP2. This release was after a period of limited rain, no discharge and potential accumulation of runoff from nearby roads. ▪ The total petroleum hydrocarbons detected in the DP2 sample were within the C_{10}-C_{36} Fraction (sum). ▪ Refer to Section 6.5 for further discussion.
	DP2 Monthly	BOD 20 mg/L	15 mg/L	▪ Elevated BOD in SW discharge (DP2) elevated levels of BOD at 20 mg/L [compared to EPN limit of 15 mg/L]. ▪ Refer to Section 6.5 for further discussion.

LEGEND:

Orange text denotes non-compliance of the parameter with EPN prescribed limits

3. OPERATIONS, MAINTENANCE AND SITE MANAGEMENT ISSUES

3.1 POWER GENERATING EQUIPMENT IN OPERATION

There has been no change in the operational equipment used at the TVPS for power generation since the previous reporting period, nor notable changes in procedures for their operation.

The power generating equipment utilised on-site is summarised in Table 3 below.

Table 3: Power generating equipment used on-site during the reporting period

UNITS	DESCRIPTION	LOCATION *
Unit 201	Mitsubishi Combined Cycle Gas Turbine (CCGT)	Facility No. 3
Unit 104	Rolls Royce Trent Open Cycle Gas Turbine (OCGT)	Facility No. 2
Units 101A, 101B, 102A, 102B and 103A	Pratt & Whitney OCGT (hereafter referred to as the FT8s)	Facility No. 1
Unit 103B	This unit was taken offline during the 2017/18 reporting period and has remained permanently in a state of long term in situ storage	

* Refer to Figure 1 for the location of operational facilities on-site.

While AETV schedules proposed periods of turbine operation of these units for the year, the actual timing of their operation is altered by the following:

- Hydro directives regarding the capacity of water storages;
- Variation in demand for State power supply; and
- Requirement for maintenance works.

The general operation of power generating equipment during the period is outlined in Table 4 and the operating hours and fuel usage in Table 8 (Section 5.2).

Unit 201 and the associated CTs were offline for most of the reporting period, with only intermittent operation early in the period as outlined in Table 3. On this basis, power during the reporting period was predominantly generated by the FT8s (Units 101A, 101B, 102A, 102B and 103A) and Unit 104.

When offline, Unit 201 was either stored in wet lay-up during short offline periods (on an 8 to 10-day cycle in preparation for restart) or placed into dry lay-up during longer offline periods (January 2019 and from June 2019 to March 2020).

LEGEND

1. PRATT & WHITNEY OPEN CYCLE GAS TURBINE (OCGT), FT8's (PEAKING PLANT)
2. ROLLS ROYCE TRENT OPEN CYCLE GAS TURBINE (OCGT)
3. MITSUBISHI COMBINED CYCLE GAS TURBINE (CCGT) & HEAT RECOVERY STEAM GENERATOR (HRSG)
4. WORKSHOPS
5. CHEMICAL STORAGE
6. WATER STORAGE
7. WATER TREATMENT PLANT
8. GATEHOUSE
9. OFFICE
10. DOMESTIC WASTE WATER TREATMENT SYSTEM
11. COOLING TOWER
12. WASTEWATER RETENTION POND (WWRP)
13. STORMWATER SETTLEMENT POND
14. FLUME
15. GAS LET DOWN STATION (TASGAS)
16. FORMER BELL BAY POWER STATION (HYDRO)

- OPERATIONAL SITE BOUNDARY
- EQUIPMENT LOCATION BOUNDARY
- DISCHARGE POINTS:
  DP1 - TREATED WASTEWATER
  DP2 - STORMWATER

TAMAR VALLEY POWER STATION - BELL BAY

FIGURE 01
OPERATIONAL FACILITIES LAYOUT

COVA
Stronger Together
1800 00 COVA
covathinking.com
ACN 117 492 814

Date: 19th MAY 2020
Prepared by: COVA Pty Ltd
Project Number: 2946.019
Client: AETV Pty Ltd

NOT TO SCALE

N

Table 4: TVPS Operational and monitoring overview (1st April 2019 to 31 March 2020)

	2019												2020		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
ENV. MONITORING for EPA Reporting:															
Wastewater Retention Pond Discharge (Monthly)	21-Jan-19	21-Feb-19	12-Mar-19	03-Apr-19	28-May-19	19-Jun-19	25-Jul-19	22-Aug-19	Maintenance shut	16-Oct-19	12-Nov-19	03-Dec-19	13-Jan-20	11-Feb-20	18-Mar-20
Inline Wastewater Discharge Temperature (Continuous)	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Stormwater Discharge (Quarterly)	-	21-Feb-19	-	-	28-May-19	-	-	22-Aug-19	-	-	12-Nov-19	-	-	11-Feb-20	-
Donovans Bay (Quarterly)	-	-	19-Mar-19	-	-	18-Jun-19	-	-	12-Sep-19	-	-	09-Dec-19	-	-	Cancelled (COVID-19)
Near Shore Temperature (M1 to M4) (Quarterly)	21-Jan-19	21-Feb-19	12-Mar-19	03-Apr-19	28-May-19	19-Jun-19	25-Jul-19	22-Aug-19	23-Sep-19	16-Oct-19	12-Nov-19	03-Dec-19	13-Jan-20	11-Feb-20	18-Mar-20
Stack (Air)	-	Pending	21/03/2019 & 22/03/2019	29/04/2019 (U104, U201)	-	17/06/2019 (U102B, U103A, U104)	8/07/2019 (U102A, U102B)	5/08/2019 (U101A, U101B)	Pending start-up next month	Postponed to mid Dec	Postponed to mid Dec	17/12/2019 (U101A, U102A, U102B, U103A, U104)	-	-	Cancelled (COVID-19)
Environmental Noise Survey (Annual)	-	-	Postponed	Postponed	Postponed to Feb/Mar 2020	-	-	-	-	-	-	-	-	-	Cancelled (COVID-19)
OPERATIONAL & ADDITIONAL ENV. MONITORING (Internal):															
Additional Wastewater Quality Sampling (As required)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other parameters _ Inline Wastewater Discharge Water Quality	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Additional Stormwater Discharge Sampling (As required)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Near Shore, WWRP & Outfall Water Quality Monitoring & Periodic Walkover Records - Field Notes (Monthly)	21-Jan-19	21-Feb-19	12-Mar-19	03-Apr-19	28-May-19	19-Jun-19	25-Jul-19	22-Aug-19	19-Sep-19	16-Oct-19	12-Nov-19	03-Dec-19	13-Jan-20	11-Feb-20	18-Mar-20
EQUIPMENT OPERATIONAL USAGE (Information for internal operational purposes)															
Rolls Royce Trent OCGT (Unit 104)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(intermittent)	(Intermittent)	(Intermittent, only 3 hrs)
Mitsubishi CCGT (Unit 201)	Dry lay-up / 8 to 10-day standby	(intermittent)	Taken offline 11/03/2019	Restarted 17-Apr-2019	Taken offline 19/05/2019	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10- day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby	Dry lay-up / 8 to 10-day standby
Pratt & Whitney OCGTs (FT8s) (Units 101A, 101B,102A, 102B, 103A & 103B)	(as needed)	(as needed)	(as needed)	(occasional)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)	(as needed)
WATER SOURCE (Information for internal operational purposes)															
Chimney Saddle (Treated Water)	(To 21-Jan-19)				(From 13-May-19)						(To 12-Dec-2019)				
Curries River Dam (Untreated Water)	(From 21-Jan-19)			(To 13-May-19)								(From 12-Dec-2019)			

3.2 MAINTENANCE SHUTDOWN

An annual maintenance shutdown (station outage) was scheduled for May-June 2019 but had to be postponed due to the lack of rainfall collected in Hydro storages requiring the possible running of Unit 201 for power generation.

The annual maintenance shutdown occurred in September 2019. It included, but was not limited to:

- Repair of manholes near WWRP;
- Desludging of the WWRP;
- Inspection of WWRP wall integrity and general maintenance; and
- Clean-up of materials in laydown areas on-site.

3.3 WASTEWATER RETENTION POND MANAGEMENT

3.3.1 WWRP MANAGEMENT OVERVIEW

During most months of the reporting period when Unit 201 and CTs were offline, low flow throughput resulted in the need for manual intervention to manage water quality issues within the WWRP. These occurrences were detected early as elevated levels of pH and DO and managed through the manual closure of the WWRP outlet valve and dosing of the pond with sodium hypochlorite to return the WQ to within EPN limits.

A new inline SWAN AMI SAC254 analyser (installed on the WWRP outfall, I1, monitoring location during the previous AER reporting period) allows for measurement of ultraviolet (UV) absorption, as a surrogate parameter to determine the level of dissolved organics in the WWRP discharge stream. Analysis of the data collected has:

- Enabled observation of correlations of changes in parameters (e.g. pH and DO); and
- Identification of trends to improve control of WQ during times of low flow from the WWRP.

The timing of these periods of non-compliant WQ in the WWRP are discussed in Section 2.2, as shown on Table 2.

It is noted that management of the water level in the WWRP manually via the outlet valve results in abnormal readings for the flow of water from DP1 (refer to Section 6.4.2 for further discussion).

As noted historically, flows can also result in turbulence in the pipe, increased inline DO levels and has potential to result in localised influence on the DO level recorded at the NS location M3 (close to DP1) as discussed in Section 6.6.3.

3.3.2 WATER SEEP INVESTIGATION

Considerable investigation of an intermittent water seep which appeared near the WWRP several years ago has been undertaken. Improvement measures implemented to date have narrowed down the likely source and reduced the flow and frequency of its appearance.

Ongoing monitoring and investigation of the intermittent seep has continued during this AER, with further repair work undertaken on manhole seals and pipework associated with the inlet to the WWRP.

The WWRP was refilled in November 2019, at which time it was tested for leaks. A leak was identified in pipework and rectifications made.

No seep was observed during the reporting period, until the pond was refilled to within 20 centimetres of the overflow mark in January 2020.

Thereafter, AETV managed the water level in the WWRP below the identified overflow height to prevent leakage and minimise the potential reappearance of the water seep. Extension of the T-standpipe inlet height has been included in the future maintenance shut work schedule.

3.3.3 WWRP MAINTENANCE AND SLUDGE MANAGEMENT

WWRP maintenance and desludging

A sludge (waste material) accumulates in the base of the WWRP. The sludge is predominantly from the on-site treatment of untreated Curries River Dam raw water supply. This occurs as a result of the treatment process removing fine suspended solids from the raw water which subsequently settle in the WWRP.

Under normal operating conditions, the WWRP requires removal of this sludge material once every year or two.

The WWRP was taken offline during September 2019 as part of a maintenance shutdown to enable:

- Removal of accumulated sludge from the pond; and
- Inspection of the liner and associated pipework as part of the WWRP seep investigation.

WWRP sludge sampling and categorisation

The accumulated WWRP sludge requires:

- Sampling and laboratory analysis to ascertain the concentration of metals (arsenic, chromium, copper, manganese, mercury, molybdenum, nickel and zinc), plus Toxicity Characteristic Leaching Procedure (TCLP) of the leachable metals; and
- Classification as a waste category to determine the appropriate method of disposal in accordance with the requirements of *Information Bulletin No, 105; Classification and Management of Contaminated Soil for Disposal* (IB105; EPA, 2018).

During the AER reporting period, samples of in situ WWRP sludge and recently removed sludge stockpiles stored on the adjacent decommissioned Bell Bay Power Station (BBPS) site were collected on 13 and 14 of August 2019 respectively.

The results (provided in Appendix C1) for both the in situ and stockpiled WWRP sludge samples recorded:

- Total metal concentrations of most metals at levels within the low-level contaminated soil (level 2) material classification; and

- Levels of leachable metals (arsenic, manganese, zinc and molybdenum) below maximum TCLP leachable concentrations for Level 2 material.

This was the same contamination classification as sludge removed and managed in previous years.

Management of removed sludge

AETV adopted the same management methodology as approved by the EPA in 2015/16 for a previous sludge management event on the BBPS.

The sludge material was removed and spread within the bunded area on a concrete pad on the BBPS site for containment and dewatering. It is proposed that the dewatered sludge material will be stored for up to two years, then re-tested to ascertain acceptability for reuse on the BBPS site for re-contouring and landscaping purposes.

To improve future management of WWRP sludge generated as part of the TVPS operation, AETV is planning to construct an evaporative (dewatering) pond on-site.

3.4 STORMWATER DISCHARGE POINT IMPROVEMENTS

Sampling stormwater from the rip rap at DP2 was difficult under low flow conditions and there was no mechanism in place for measurement of flow rate. To address this, AETV undertook improvements to the stormwater pond discharge point (DP2) during the period February to April 2020, comprising:

- Installation of a v-notched weir to enable measurement of discharge flow (Plate 1);
- Installation of monitoring equipment with telemetry system to connect with the existing supervisory control and data acquisition (SCADA) system (Plate 2); and
- Improvements to discharge outfall channel.

Plate 1: V-notched weir on stormwater discharge point DP2

Plate 2: Stormwater discharge point improvements and telemetry system

3.5 CONTAMINATED GRAVEL TREATMENT AND ON-SITE REUSE

AETV identified an area of contaminated compacted gravel hardstand on-site in April 2019 where a spill of approximately 200 litres of diesel was reported by AETV personnel to have occurred, resulting in contamination of approximately 50 cubic metres of gravel.

The contaminated material was sampled on 11 April 2019. Analysis results for the material classified it as Level 4 contaminated soil for remediation under IB105 (EPA, 2018).

An Environmental Approval (EA) No.9712/1 was issued to AETV, allowing for the temporary storage of the contaminated gravel material on-site within a fully bunded area to provide treatment and reuse of the material as hardstand if effectively treated.

Follow-up laboratory analysis of the material showed levels of polychlorinated biphenyl (PCB) and hydrocarbons to have reduced significantly such that it was classified as Level 1 fill material.

In response to the Level 1 fill material classification, EPA correspondence dated 1 July 2019 advised that the requirements of EA No.9712/1 had been fulfilled and the material could be reused on the BBPS site if required (EPA, 2019a; Appendix C2).

4. MONITORING AND REPORTING OVERVIEW

AETV has continued to implement its operational and environmental monitoring (including sampling, collection of monitoring data and investigations) and reporting programs as outlined in Table 5.

Table 5: AETV's operational and environmental monitoring and reporting

OPERATIONAL	ENVIRONMENTAL
▪ Incidents and complaints	▪ Environmental incidents
▪ Procedural and operational equipment changes	▪ Stack emission testing
▪ Compliance with EPN maximum quantity regulatory requirements	▪ Treated stormwater (SW) discharge water quality measured at DP2
▪ Water usage (from two sources)	▪ Treated wastewater (WW) water quality and flow both inline (I1&I2) and at discharge point (DP1).
▪ Turbine operational hours and fuel usage	▪ NS discharge temperature (other parameters on a voluntary basis)
▪ Solid and liquid waste produced	▪ DB water quality
▪ Hazardous materials	▪ Equipment noise calibration
▪ Emergency response and contingency plan	▪ Site-wide environmental noise survey
	▪ Site inspections

An overview of the timing of environmental monitoring and correlation of operational equipment usage and water supply during the reporting period is shown in Table 4.

It should be noted that restrictions relating to the COVID-19 pandemic, and associated delays in the transport of hired monitoring equipment, prevented some aspects of monitoring from occurring during March 2020. The EPA have granted AETV an exemption from monitoring when COVID-19 restrictions have made it logistically too difficult to proceed (EPA, 2020; Appendix D).

5. OPERATIONAL MONITORING AND REPORTING

5.1 WATER USAGE SUMMARY

While there is no compliance limit for water usage in the EPN, AETV reports water usage in the AER to provide context for process and treated wastewater discharge discussions. Water usage information improves understanding of the changes in WWRP operation, discharge WQ and flow rates.

A large volume of raw water is supplied annually to the TVPS from either of two water supplies:

- Treated water from the Chimney Saddle; and
- Untreated water from the Curries River Dam.

The water source is varied by Tasmanian Water and Sewerage Corporation Pty Ltd (TasWater) based on the status of its water storage levels.

Regardless of the source, raw water is directed to the raw water tank for treatment to ensure it is fit for use within Unit 201 and the CTs. Water of suitable quality is directed straight from the raw water tank to the CTs.

The TVPS was operated using treated water from the Chimney Saddle water supply for approximately half the reporting period. A summary of the raw water supply sources and volumes stored and consumed on-site during the reporting period are summarised in Table 5.

Table 6: Total raw water supply, storage and usage (1 April 2019 to 31 March 2020)

MONTH	RAW WATER SUPPLY		STORAGE IN RAW WATER TANK (m^3)	USE IN COOLING TOWERS (m^3)	UNIT 201 OPERATION
	Curries River Dam (Untreated)	Chimney Saddle (Treated)			
Apr-2019			58,582	23,610	Restart on 17/4/19
May-2019			3,618	10,477	Taken offline 19/5/2019
Jun-2019	To 12/5/19	From 13/5/19	10,781	12	Offline into dry lay-up / 8 to 10-day standby
Jul-2019			693	0	
Aug-2019			7,749	0	
Sep-2019			3,135	0	
Oct-2019			10,906	0	
Nov-2019			6,254	3,536	Restart preparation / Did not proceed
Dec-2019	From 12/12/19	To 11/12/19	5,656	10	
Jan-2020			5,484	36	
Feb-2020			3,843	48	
Mar-2020			2,440	24	
Total:	6 months	6 months	119,141 m^3	37,753 m^3	

5.2 OPERATIONAL HOURS AND FUEL USAGE

The total gas consumption of power generating equipment at the TVPS when operated as synchronous condensers during the reporting period was 2,459,844 GJ. This is equivalent to approximately 55,352 T of gas (using the conversion factor 44.44 GJ/T, from *National Pollutant Inventory Combustion in Boilers Manual Version 3.6 December 2011*) (NPI, 2011).

Table 7 below provides a summary of compliance with maximum quantities as prescribed in EPN Condition Q1 for fuel usage and power generation.

Table 7: Compliance with maximum quantities as per EPN Condition Q1

DETAILS	MAXIMUM QUANTITIES	SUMMARY FOR THE 2018/19 AER REPORTING PERIOD
Condition Q1(1) 77 T/hr of total capacity to consume fuel	12.69 T/hr	This fuel was consumed over a total of approximately 4,362 hours (with synchronous condensers), resulting in an average consumption (fuel usage efficiency) of 12.69 T/hr. Unit 201 was offline for most of the reporting period and State run of-the-river hydro power supply reduced the need to use other power generating equipment, so the fuel consumption was well below the prescribed EPN limit of 77 T/hr.
Condition Q1(1.4) 100 hrs / 12-month period burning distillate fuel	N/A	All power generating equipment at the TVPS was operated on natural gas. No distillate fuel (diesel) was consumed.

LEGEND:
Green text denotes the total capacity of fuel consumed as being compliant with EPN prescribed limits.

An improvement in fuel usage efficiency was recorded when the open cycle gas turbines (OCGTs) (Rolls Royce and FT8s) were operated as generating equipment with synchronous condensers (12.69 T/hr) compared to without (17.63 T/hr).

Further information regarding operational hours and fuel (gas) usage of all turbines during the reporting period is provided in Table 8 below, presenting fuel usage as "with" and "without" synchronous condensers.

Table 8: TVPS turbines operating hours and calculated total fuel usage (1 April 2019 – 31 March 2020)

MONTH	MITSUBISHI UNIT		ROLLS ROYCE UNIT		FT8 OCGT UNITS						
	Unit 201 CCGT		Unit 104 OCGT		Unit 101 A / B		Unit 102 A / B		Unit 103 A		FT8
	Operating Hrs	Gas Usage GJ	Operating Hrs	Gas Usage GJ	Operating Hrs	Synchronous Condenser Hrs	Operating Hrs	Synchronous Condenser Hrs	Operating Hrs	Synchronous Condenser Hrs	Gas Usage GJ
Apr-2019	335.00	526,182.00	295.25	165,663	14.00	0.00	16.00	0.00	2.00	0.00	15,440
May-2019	446.75	689,659.00	66.25	36,433	1.00	0.00	1.00	0.00	1.00	0.00	370
Jun-2019	0.00	0.00	315.25	178,310	7.25	0.50	17.25	0.00	11.50	17.25	12,748
Jul 2019	0.00	0.00	343.50	194,792	9.75	0.00	6.50	7.00	1.50	8.50	7,557
Aug-2019	0.00	0.00	258.00	145,224	5.50	73.75	6.25	74.00	3.50	81.50	6,089
Sep-2019	0.00	0.00	14.25	8,489	1.00	0.00	0.00	0.00	0.00	0.00	394
Oct-2019	0.00	0.00	354.00	199,197	3.50	5.00	8.50	36.50	2.00	259.25	5,954
Nov-2019	0.00	0.00	154.50	94,974	0.00	93.50	0.50	14.25	0.00	145.00	160
Dec-2019	0.00	0.00	115.15	62,138	23.50	13.50	22.15	83.00	23.50	30.50	26,828
Jan-2020	0.00	0.00	89.00	46,238	0.00	10.25	0.00	0.00	0.00	68.15	25
Feb-2020	0.00	0.00	60.15	34,312	0.00	14.00	0.75	0.00	0.00	65.00	335
Mar-2020	0.00	0.00	3.00	1,759	0.50	0.00	1.00	0.00	0.50	220.00	574
Total 2019/20:	**781.75**	**1,215,841.00**	2,068.30	1,167,529	66.00	210.50	79.90	214.75	45.50	895.15	76,474

	Without synchronous condensers:		With synchronous condensers:	
Total gas usage (as GJ):	2,383,370	GJ	2,459,844	GJ
Total gas usage (as Tonnes):	53,631	T	55,352	T
Total operating hours:	3,041	hrs	4,362	hrs
Fuel usage (efficiency):	17.63	T/hr	12.69	T/hr
EPN total capacity to consume fuel:	77	T/hr	77	T/hr

LEGEND:

Unit 201 was offline in lay-up for some or all of this month.

The FT8s were operating as power generating turbines (i.e. not as synchronous condensers).
FT8 Units 101 A/B were off-line (i.e. not operating).

Green — Green text denotes compliance with EPN prescribed limits

5.3 SOLID AND LIQUID WASTE MANAGEMENT

Wastes generated by the TVPS operation are managed in accordance with the waste management hierarchy. Generation of waste materials is minimised where possible, and generated wastes are separated, reused, recycled and disposed of in an approved manner. A summary of the types and quantities of primary solid and liquid waste materials generated on-site and their management are provided in Table 9.

No hydrocarbon waste, PCB waste or fluorescent tubes were generated or required waste management during the reporting period.

Comparison of solid and liquid waste generation during this reporting period (2019/20) to the previous reporting period (21018/19) shows decreases in the following wastes:

- Recycled paper - decreasing from 1,680 L to 1,440 L;
- Recycled cardboard - decreasing from 25,000 L to 9,900 L; and
- Liquid waste – decreasing from 266,500 L to 44,000 L.

Recycled paper and cardboard waste generation on-site is predominantly associated with packaging of spare parts. The recorded decrease is a reflection of the difference between wastes generated from the major maintenance outage of Unit 201 in 2018/19 compared to a normal maintenance shut undertaken in 2019/20.

Similarly, the notable decrease in the generation of liquid waste (sewage) since the previous reporting period is the result of a reduction of 300 personnel working on-site (associated with the major maintenance outage) compared to normal operations in 2019/20 reflecting the volumes recorded in the two years prior to the major maintenance shut.

Improved adoption of recycling was recorded as a slight increase in the generation of co-mingled recycling in 2019/20 (1,920L), up from 1,680 L in 2018/19.

The quantity of general waste remained the same as the previous reporting period (528 m^3).

Further waste improvements that AETV have instigated which are not shown in Table 9 include:

- Provision of extra waste skip bins brought to site in February 2020 to facilitate removal of excess waste materials for recycling or disposal to facilitate clean-up of the laydown area; and
- Ordering of new bins for sorting waste streams for use in the Administration building, as part of Hydro Tasmania's zero waste to landfill campaign which commenced in March 2020.

Table 9: Solid and liquid waste materials management summary (1 April 2019 to 31 March 2020)

MONTH	GENERAL WASTE			RECYCLED Paper			RECYCLED Cardboard			RECYCLED Comingled			LIQUID WASTE (Sewage and oily water)		
	Qty (m^3)	Removed By	Removed To	Qty (L)	Removed By	Removed To	Qty (L)	Removed By	Removed To	Qty (L)	Removed By	Removed To	Qty (L)	Removed By	Removed To
Apr-19	36	Veolia	Ltn	nil			1100	Veolia	Ltn	240	Veolia	Ltn	nil		
May-19	36	Veolia	Ltn	nil			1100	Veolia	Ltn	240	Veolia	Ltn	nil		
Jun-19	45	Veolia	Ltn	nil			1100	Veolia	Ltn	240	Veolia	Ltn	8000	Veolia	TTB
Jul-19	36	Veolia	Ltn	720	Veolia	Ltn	1100	Veolia	Ltn	nil			nil		
Aug-19	36	Veolia	Ltn	nil			nil			nil			nil		
Sep-19	42	Veolia	Ltn	nil			2200	Veolia	Ltn	240	Veolia	Ltn	8000	Veolia	TTB
Sep-19	18	Scotcon	Ltn												
Oct-19	36	Veolia	Ltn	720	Veolia	Ltn	nil			nil			8000	Veolia	TTB
Nov-19	36	Veolia	Ltn	nil			1100	Veolia	Ltn	240	Veolia	Ltn	nil		
Dec-19	45	Veolia	Ltn	nil			1100			240	Veolia	Ltn	8000	Veolia	TTB
Jan-20	36	Veolia	Ltn	nil			nil	Veolia	Ltn	240	Veolia	Ltn	nil		
Feb-20	81	Veolia	Ltn	nil			1100	Veolia	Ltn	nil			nil		
Mar-20	45	Veolia	Ltn	nil			nil			240	Veolia	Ltn	7000	Veolia	TTB
Mar-20													5000 Oily water	Veolia	Ltn
Total 2019/20	**528**	**m^3**		**1,440**	**Litres**		**9,900**	**Litres**		**1,920**	**Litres**		**44,000**	**Litres**	
Total waste quantities for two previous AER years for comparison:															
Total 2018/19	528	m^3		1,680	L		25,000	L		**1,680**	**L**		266,500	L	
Total 2017/18	254	m^3		2,160	L		11,000	L		**1,680**	**L**		43,500	L	

LEGEND: Ltn Launceston TTB Ti-Tree Bend

6. ENVIRONMENTAL MONITORING AND REPORTING

6.1 STACK EMISSION MONITORING AND REPORTING

6.1.1 QUARTERLY STACK EMISSION MONITORING

AETV undertake air quality monitoring during the reporting period as follows:

- Quarterly testing of stack emissions from all power generating equipment when under full load and normal operating conditions (as operational logistics permitted), with FT8s tested in a rotational manner; and
- Operational stack emission testing using a hand-held meter.

The location of power generating equipment is as shown on Figure 2.

The handheld air emission testing equipment will:

- Allow for identification of changes in air emission parameters during operation of equipment between scheduled quarterly testing events (i.e. measure a reduction in air quality);
- Support improved management of intermittently operated equipment; and
- Be regularly compared to expert calibrated equipment to check accuracy and/or accepted deviations or trends.

The equipment to be used for power generating and the duration of its use is difficult for AETV to accurately plan, as it is dependent on the level of water storages and Hydro decisions regarding the energy market and meeting the State's power demand. Given this, some equipment is not operational when specialist air consultants are available to undertake testing.

To improve the frequency of power generation equipment testing and better comply with EPN stack emission requirements, AETV are developing a procedure to:

- Guide prediction of when power generating units will be operational and available for stack testing during each quarter; and
- Allow equipment that was not operational during scheduled specialist air consultant monitoring events to have indicative testing recorded using the hand-held meter.

This procedure will be provided to the EPA for approval prior to its implementation.

6.1.2 FREQUENCY OF STACK EMISSION TESTING

Despite scheduling stack air emission monitoring events to be undertaken on a quarterly basis at a time when most power generating equipment was in operation, the following logistics made it difficult for AETV to fully comply with the requirement for testing of all equipment quarterly during the reporting period;

- Unit 201 was in lay-up for most of the reporting period so was only tested once (29 April 2019).

- The FT8s turbines (Units 101, 102 or 103) were operated on an intermittent, as needed, basis to fit in with power generation requirements, as directed by Hydro.

- AETV made every effort to monitor stack emissions from the FT8s on a rotational basis when operating under full load and normal operating conditions (each FT8 was tested twice during the reporting period. There was little or no FT8s operation during the April and August/September monitoring periods, so limited testing was possible, see Table 8).

- Similarly, Unit 104 was operated on an intermittent as needed basis, often for less than a day (despite this, Unit 104 was tested on three occasions during the reporting period).

- Site access restrictions relating to the COVID-19 pandemic in March 2020 prevented specialist air consultants from coming to site to undertake testing work, so no formal equipment testing was possible (handheld device measurements indicated stack emissions were within acceptable limits).

NOTE: Unit 103B (an FT8) was not monitored as it continued to be maintained permanently offline in a state of long term in situ storage.

6.1.3 STACK EMISSION COMPLIANCE WITH EPN LIMITS

The timing of quarterly stack emission monitoring events during the reporting period is summarised in Table 10, with comparison to the applicable EPN limit for each unit.

All equipment tested during the reporting period was found to be compliant with the EPN NOx limit (as NO2 corrected to 15 % O2) as outlined in Condition A2(2).

As indicated in Section 6.1.2, organising testing to include all equipment was logistically challenging, so not all were able to be tested each quarter. A summary of results for each power generation unit is provided in Appendix E1, and copies of the stack testing reports are provided in Appendices E2 to E5.

It should be noted that the test undertaken in April 2019 of Unit 201 and 104 was to follow-up on testing undertaken in March 2019 (and reported in the previous AER). The follow-up test was undertaken as these two units had not been in operation at the time of the original testing.

Due to the low requirement for power generation, it was not possible to assess stack emissions when all power generation equipment was in operation during the June 2019 quarter. On this occasion, multiple testing events were undertaken in June/July and August 2019 to best meet EPN requirements. Unfortunately, this it was not possible to undertaken additional testing during September 2019 as equipment use was even lower and less predictable. (Note: FT8s operated for a total of 1 hour in September, and Unit 104 for a total of 14.25 hours, see Table 8).

Table 10: Stack testing results for NO_x levels in emissions (as NO_2 @ 15 % O_2) (1 April 2019 to 31 March 2020)

UNIT	TURBINE	EPN LIMIT	NO_x (as NO_2 @ 15 % O_2)				
			Follow-up	June	August/ September	December	March
			29-Apr-19	27-Jun 19 & 8-Jul-19	5-Aug-19	17-Dec-19	1-Mar-19
Unit 101A	Pratt & Whitney OCGT	70	No Test	No Test	67	57	#
Unit 101B	Pratt & Whitney OCGT	70	No Test	No Test	69	55	#
Unit 102A	Pratt & Whitney OCGT	70	No Test	69	No Test	62	#
Unit 102B	Pratt & Whitney OCGT	70	No Test	68	No Test	66	#
Unit 103A	Pratt & Whitney OCGT	70	No Test	59	No Test	59	#
Unit 103B	Pratt & Whitney OCGT	70	Permanently Offline in long term in situ storage				
Unit 104	Rolls Royce Trent OCGT	60	54	44	No Test	37	#
Unit 201	Mitsubishi CCGT	60	55	Offline	Offline	Offline	Offline #

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	The Unit was not operational at a suitable time during this quarter to enable testing.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.

Hand-held meter testing of stack emissions was undertaken at the time of quarterly monitoring events to calibrate equipment and confirm effective operation of the meter in preparation for its future use when the new testing procedure is implemented.

6.2 NOISE MONITORING

6.2.1 NOISE SOURCES AND CONTINUOUS MONITORING

There have not been any notable additions of equipment or changes to the site operations during the reporting period that would add to the noise profile for the site and require an update to the site-wide environmental noise survey, or noise emissions model.

AETV continued to monitor noise emissions from the operation during the AER reporting period using a permanent (calibrated) noise monitoring station located on-site (as shown in Figure 2).

Data collected by this permanent monitoring station supports the annual noise survey through early identification of potential issues and allows for follow-up of noise complaints.

6.2.2 APRIL / MAY ANNUAL ENVIRONMENTAL NOISE SURVEY

Unforeseen circumstances prevented an annual environmental noise survey from being completed when all power generating equipment was in operation as a single event during the previous AER (2018/19) reporting period.

An interim partial noise survey had been undertaken at that time, then a further site-wide noise survey was to be undertaken at the next practicable opportunity, which ended up being between 30 April to 16 May 2019 (Tarkarri Engineering, 2019; Appendix F).

While the timing of the survey was just outside of the previous AER reporting period, its findings were available during the writing up period, so were included in that report as supporting evidence of effective operation and AETV's commitment to managing noise in compliance with EPN conditions.

As required by EPN noise conditions, the survey (Tarkarri Engineering, 2019):

- Included noise measurement at a time when all types of power generating equipment were in operation at the TVPS;
- Measured noise at six monitoring positions as adopted for previous surveys (four of which are sensitive noise receptor locations);
- Conducted the survey in accordance with the *Tasmanian Noise Measurement Procedures Manual*; and
- Addressed TVPS EPN noise condition requirements (i.e. time intervals and prescribed equivalent continuous A-weighted sound pressure levels for noise limit areas A and B).

The survey concluded that:

- TVPS during peak plant operations was audible at sensitive noise receptor locations (2, 4, 5 and 6) during the day, evening and/or night;
- Noise emissions were commensurate with levels measured during previous surveys and remained within acceptable EPN noise emission limit levels; and
- Noise emissions from TVPS operations continue to be below the EPN limits set out in Condition N1.

For further details of the survey (Tarkarri Engineering, 2019) and its findings, refer to the environmental noise survey report provided in Appendix F.

6.2.3 POSTPONEMENT OF ANOTHER SCHEDULED SURVEY

To ensure EPN requirements were met, another annual environmental noise survey was scheduled to be undertaken during the 2019/20 AER reporting period at a suitable time in February – March 2020. Unfortunately, the monitoring event:

- Had to be postponed as a suitable time when all power generating equipment was to be in operation could not be identified; and
- Was then cancelled due to COVID-19 restrictions making it logistically too difficult to reschedule in the foreseeable future.

AETV have been granted an exemption for undertaking the annual environmental noise survey during this period of COVID-19 restrictions (EPA, 2020; Appendix D). The annual environmental noise survey will be rescheduled for a time when all power generating equipment is in operation and COVID-19 restrictions have eased sufficiently for it to proceed.

In the absence of this additional survey, the continuous noise monitoring equipment on-site will enable review of effective noise operation as measured at the site, allowing for identification and follow-up of a potential noise issue or complaint being received.

6.3 DISCHARGE AND RECEIVING WATER QUALITY MONITORING OVERVIEW

AETV monitors the WQ of discharges from the TVPS and potential impact on the ambient receiving environment through inline probes and the collection of regular grab samples from locations as specified in the EPN and shown in Figure 2.

Description of the discharge and receiving environment water quality monitoring locations and sampling frequency are detailed in Table 11.

Table 11: Discharge and receiving environment water quality monitoring

LOCATION	DESCRIPTION OF MONITORING	FREQUENCY
I1 & I2	Monitoring of water quality parameters in WWRP discharge via: ▪ I1 on the outlet of the WWRP; and ▪ I2 in the discharge flume sump.	Continuous and Monthly
DP1	Monitoring of water quality parameters in WWRP wastewater emissions discharged into DB, with inclusion of additional voluntary parameters: ▪ COD; ▪ Total petroleum hydrocarbons (TPH); and ▪ Trihalomethanes (THM).	Monthly
M1-M4	Monitoring of receiving environment temperature at NS locations for comparison with that of treated wastewater discharge from DP1.	Monthly
M1-M4	Monitoring using field and laboratory analysis of WQ (eutrophication) parameters at NS locations. This was originally an EPN requirement but is now undertaken on a voluntary basis.	Monthly
D1-D4	Monitoring of WQ parameters in the receiving environment for DP1 and DP2 (via using field and laboratory analysis) at two locations within DB and two background locations for comparison within the Tamar Estuary.	Quarterly
DP2	Monitoring of treated stormwater discharge water quality (DP2).	Quarterly
T1 and T2	Tamar River WQ monitoring as specified in the EPN has not been triggered, so is not currently required.	Not applicable

LEGEND

- DP — DISCHARGE POINT WATER QUALITY MONITORING SITE
- D — WATER QUALITY MONITORING SITES
- M — NEAR SHORE AMBIENT WATER QUALITY
- T — TAMAR RIVER MONITORING LOCATIONS T1 & T2 (NO LONGER REQUIRED TO BE MONITORED)
- T — INLINE WATER QUALITY MONITORING SITES (I1 – INLINE AT WWRP, I2 – INLINE AT SUMP)
- AMBIENT DIFFUSE & POINT SOURCES OF CONTAMINATION
- OPERATIONAL SITE BOUNDARY

COORDINATES FOR OFFICIAL DISCHARGE POINTS (OUTFALLS)			
MONITORING LOCATION	DESCRIPTION	LATITUDE	LONGITUDE
DP1	WASTE WATER DISCHARGE PIPE INTO DONOVANS BAY	41° 8" 24.8' S	146° 54" 4.6' E
DP2	STORMWATER DISCHARGE POINT INTO DONOVANS BAY	41° 8" 15.5' S	146° 54" 7' E

TAMAR VALLEY POWER STATION - BELL BAY

FIGURE 02
WATER QUALITY MONITORING LOCATIONS

COVA
Stronger Together
1800 00 COVA
covathinking.com
ACN 117 492 814

Date: 19th MAY 2020
Prepared by: COVA Pty Ltd
Project Number: 2946.019
Client: AETV Pty Ltd

NOT TO SCALE

N

In summary, the TVPS operation has two discharges into DB which have potential to impact on the receiving environment if not treated and managed effectively:

- DP1 for discharge of treated wastewater (WW); and
- DP2 for discharge of treated SW.

All samples for WQ monitoring are collected in accordance with approved Australian Standards and analysed by National Association of Testing Authorities (NATA) approved methods in a laboratory that is accredited by NATA.

The exception being, free chlorine testing which the EPA has approved to be undertaken on-site in accordance with accepted methodology and trained personnel. Supporting information is included in Appendix G1.

Field measurements are collected using appropriately calibrated equipment.

6.4 TREATED WASTEWATER DISCHARGE (DP1)

6.4.1 Overview of WWRP operations

The WQ of treated WW released via DP1 under normal operating conditions was typically within acceptable limits.

Limited operation of power generating equipment during the reporting period however, presented the following notable operational issues related to the WWRP:

- Unit 201 and associated cooling towers were offline for most of reporting period (minor operation 17 April to 19 May 2019), resulting in limited flow throughput in the WWRP and discharge of treated WW via DP1.
- The low flow environment within the WWRP made maintenance of a stable WQ difficult, necessitating frequent manual operation of the WWRP outlet valve and dosing with sodium hypochlorite to:
  - Rebalance DO, pH and BOD levels; and
  - Manage algal growth.
- No water samples were collected from DP1 and hence no results available for:
  - September 2019 as the WWRP had been drained to enable maintenance works to proceed; nor
  - October 2019 when the WWRP outlet valve was still closed during WWRP refilling and manual management to improve WQ (a sample was collected from within the WWRP in October 2019 for internal management purposes).

6.4.2 DP1 wastewater discharge flow rate (under normal operations)

As shown in Table 12, the daily WW discharge to DB was compliant with the EPN limit of 5 ML/day and 550 ML/yr when under normal operating conditions, with an average flow rate of 0.99 ML/day and 363.35 ML/yr.

The low DP1 average flow rate per day is due to Unit 201 and associated CTs being offline for most of the period. As reported during the previous 12-month period, the manual operation of the WWRP outlet valve (i.e. an atypical operation) was required to manage out-of-specification WQ under these low flow conditions.

Table 12: DP1 wastewater discharge flow rate (1 April 2019 to 31 March 2020)

DP1 WASTEWATER DISCHARGE	DISCHARGE FLOW RATE	UNITS
Average flow rate per hour	41.82	kL/hr
Calculated flow rate per hour (based on EPN Limit of 5 ML/day)	208.33	kL/hr
Maximum flow rate per day	5.22*	ML/day
DP1 Average flow rate per day	0.99	ML/day
EPN limit (Condition Q1 (1.2))	5	ML/day
DP1 Maximum flow rate per year	363.35	ML/yr
EPN limit (Condition Q1 (1.3))	550	ML/yr

LEGEND:

Green — Signifies compliance with the EPN limit for WW discharge flow rate

* — Signifies a false flow rate reading during atypical operating conditions (i.e. not a true exceedance of the EPN limit)

6.4.3 Influence of WWRP outlet closure on discharge flow rate

While the flow rate recorded when the WWRP outlet valve was being manually operated was above the EPN limit of 5 ML/day, they are not considered to be true exceedances as they were not recorded under normal operating conditions.

The manual closure of the WWRP outlet valve has been identified to result in a false flow rate being recorded. This is due to the retention of water until conditions within the WWRP return to within EPN limits before its release. This elevated water level on the v-notch weir is measured by a non-contact ultrasonic level sensor and is calculated as a high flow and initial surging discharge flows upon reopening of the outlet valve records as false readings ranging from 208 to 214 kL/hr, with a maximum of 5.22 ML/day.

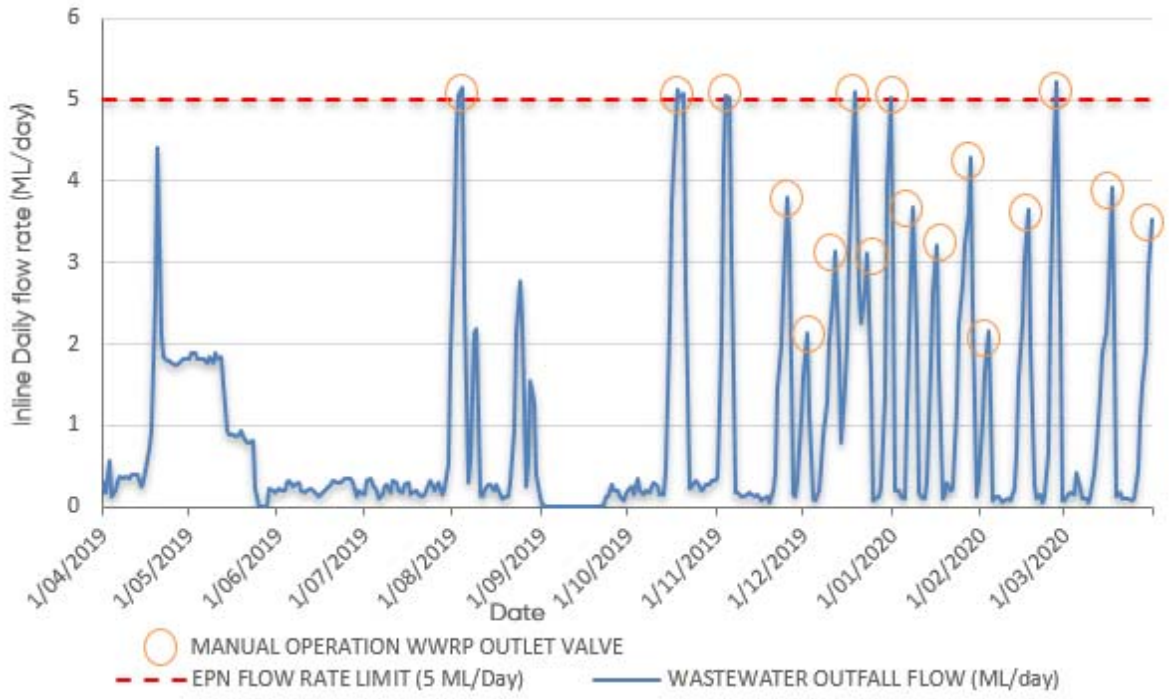
There were 16 periods of manual operation of the WWRP outlet valve during the reporting period, each period being of 4 to 11-day duration (peaks associated with these periods are shown on Figure 3 by an orange circle. Six of these peaks extend above the EPN limit of 5 ML/day. A summary of daily average flow rate is provided in Appendix G2.

Review of the flow rates shown in Figure 3, with elimination of the false flow rate spikes (periods of atypical operation), shows:

- Several periods of increase flow rates during the periods April to June and mid-August 2019 reflect the higher power demand at that time (running of Unit 104); and

- Very low flow rates during most of the 12-month reporting period relates to the low WWRP water throughput associated with Unit 201 being offline and the low requirement for intermittent power generation during peak load demand events.

Figure 3: Wastewater discharge inline flow rate compared to EPN limit (5 ML/day)



6.4.4 Monthly DP1 discharge wastewater quality

A summary of monthly treated WW discharge results recorded at DP1 is provided in Appendix G3.

On 11 February, a pH of 7.9 pH units was recorded at the outfall (DP1) under low flow conditions when Unit 201 was offline. While this result was within the acceptable EPN pH range (6.5-8.5 pH units), the WWRP inline pH from the same monthly sampling round recorded a pH of 8.60 pH units, which is outside of the EPN prescribed pH range.

Inline readings are an indicator that WWRP may not be operating effectively. This is an example of how AETV's operational systems allow for identification of potential issues and facilitate timely implementation of management measures. In this instance, it was the manual closure of the WWRP outlet valve and dosing of the pond with sodium hypochlorite to rebalance the pH to bring it back within the acceptable range.

WQ parameters measured in treated WW released from discharge point (DP1) were consistently within acceptable levels of EPN compliance during the reporting period, with the exception of two occasions (as reported in Table 2):

- 12 November 2019 – an elevated BOD of 6 mg/L compared to EPN limit of 5 mg/L; and
- 28 May 2019 – an elevated ammonia-nitrogen (ammonia-N) level of 0.98 mg/L compared to EPN limit of 0.5 mg/L.

Each of these non-compliance events correlated with difficultly managing DO, pH and algal growth within the WWRP when operated under low flow conditions associated with Unit 201 being offline. These occasions of WQ imbalance have been managed by manual operation of the WWRP outlet valve and sodium hypochlorite dosing as described previously in this section.

Learnings from adoption of this manual intervention strategy during the previous AER reporting period and installation of a new inline BOD meter have allowed for earlier identification of potential WQ imbalances and improved management evidenced as fewer non-compliances for DP1 discharge when compared to the last reporting period.

Since Unit 201 was offline for most of the reporting period, WWRP WQ balance issues experienced during the previous reporting period when operating on the Curries Water supply, and with Unit 201 under higher flow conditions were not realised. The increased capabilities for inline identification of potential WQ issues at the WWRP outlet I1, has enabled improved management of discharge water quality.

6.4.5 Daily average discharge wastewater quality (inline at I1 and I2)

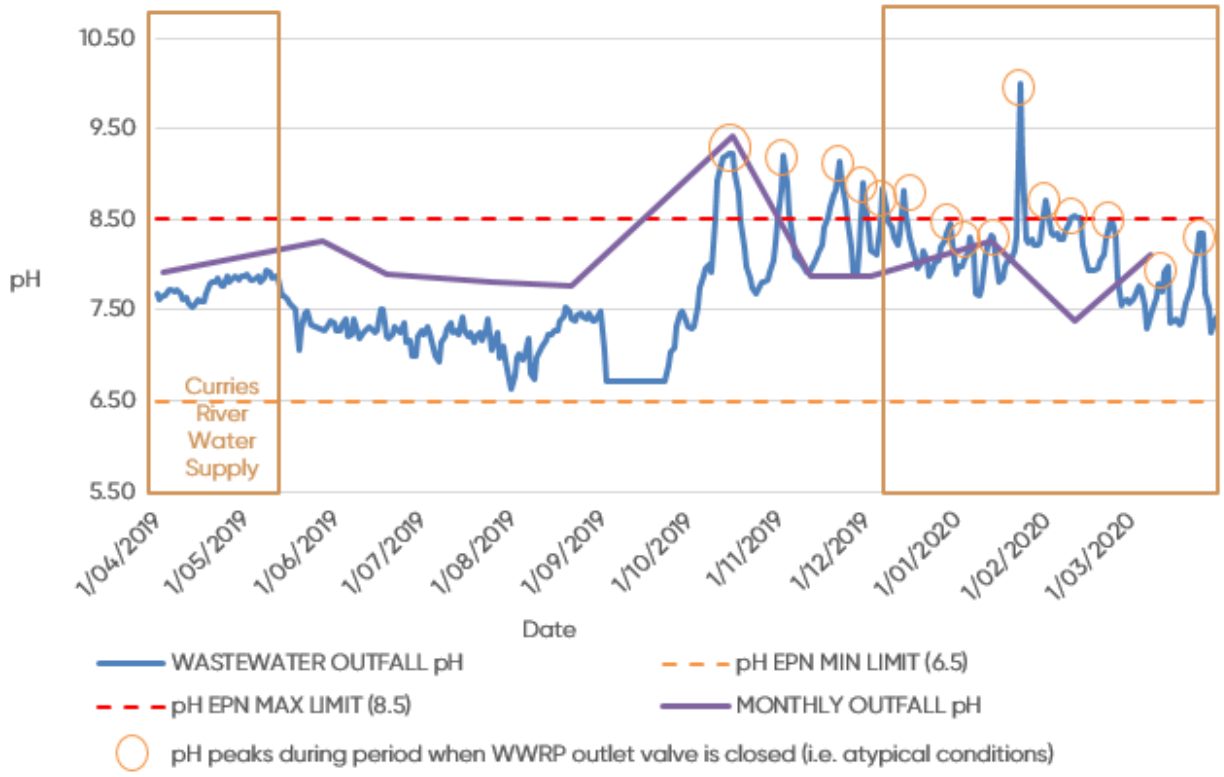
A summary of inline daily WQ results measured at I1 (WWRP outlet) and I2 (prior to DP1) together with graphs (as appropriate) are provided in Appendix G2.

Comparison of inline and monthly outfall pH levels

Daily and monthly inline pH levels were compliant with the prescribed EPN pH range (6.5 to 8.5 pH units) when under normal operating conditions.

Non-compliant pH readings were recorded for one monthly outfall pH result on 16 October 2019 and during fifteen of the sixteen periods when the WWRP outlet valve was closed to facilitate manual dosing of the pond with sodium hypochlorite to bring the out of specification WQ back to within acceptable limits (Figure 4). Dosing of sodium hypochlorite elevates the pH for a short period.

Figure 4: Comparison of daily inline and monthly outfall (DP1) pH levels



Under normal operating conditions, the following daily inline pH readings were recorded to have been outside of the EPN range of 6.5 to 8.5 pH units in the days prior to (and resulting in the need for) manual closure of the WWRP outlet valve (as summarised in Table 2):

- 10, 11 and 12 October 2019 (pH 8.93, 9.09 and 9.18 pH units respectively);
- 18 and 19 November 2019 (pH 8.52 and 8.62 pH units respectively); and
- 10 and 11 February 2020 (pH 8.52 and 8.54 pH units respectively) (alkaline pH was recorded for both daily and monthly inline pH readings on 11 February 2020).

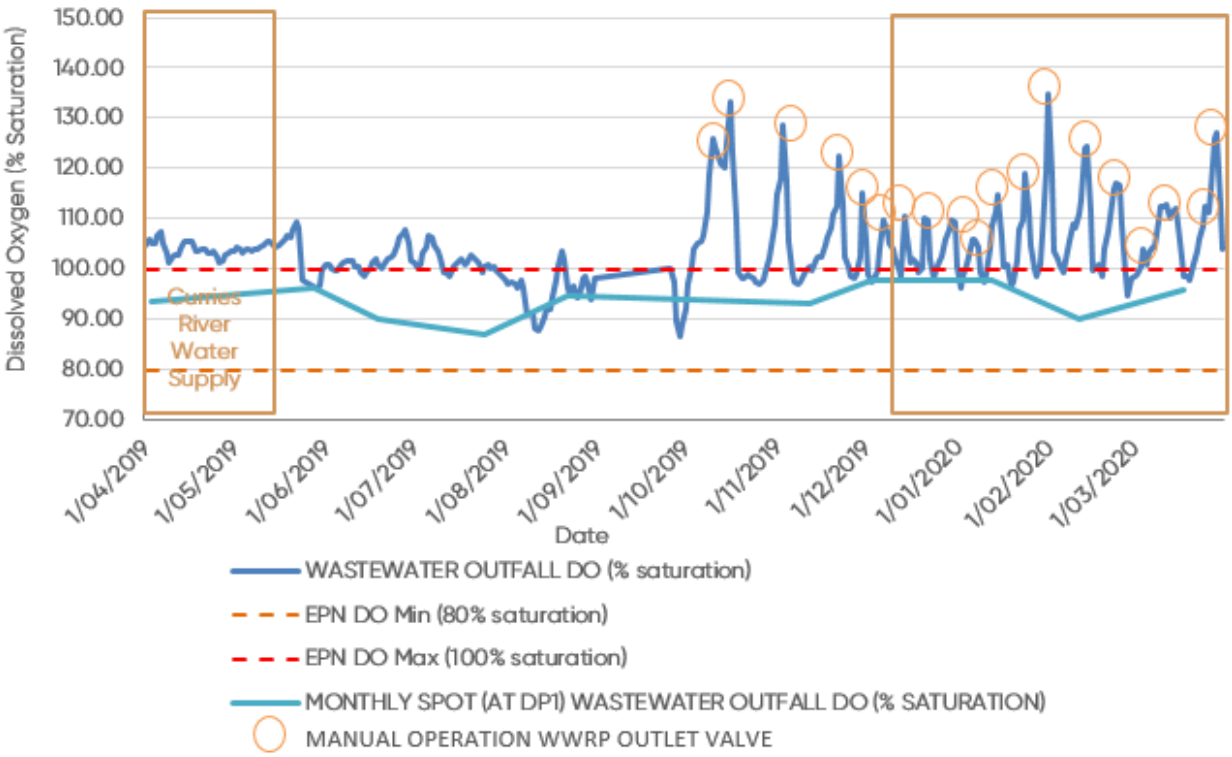
The pH readings on the above dates are therefore considered to be non-compliance events.

DO in wastewater discharge

As observed in previous reporting periods, the DO measured inline within the WW discharge pipe was frequently recorded at levels above the EPN upper limit of 100% saturation. This is due to turbulence within the pipe, aeration caused by wind over the surface of the pond, aquatic photosynthesis and the temperature of the pond water.

When measured at the end of pipe discharge point (DP1) during monthly grab sampling however, the DO level of WW discharge was consistently recorded at levels within the EPN DO range of 80 to 100% saturation and was therefore compliant with EPN limits.

Figure 5: Daily DO inline and grab (at DP1) in wastewater discharge (% saturation)



Note that there were no values for the period 1 to 24 September 2019 shown in Figure 5, as this was when the WWRP had been drained during the maintenance shutdown.

Ongoing Investigation of WWRP stability and improved operation

AETV is continuing to investigate ways to improve WWRP stability:

- During atypical operations (such as start-up and shutdown of Unit 201);
- When manually operating the WWRP outlet valve under low flow / out-of-specification WQ conditions; and
- When operating on Curries River water supply to ensure optimal operation and improved compliance.

In relation to improved knowledge of WWRP WQ, AETV have continued to voluntarily monitor levels of Trihalomethane (THM) in treated discharge WW samples collected at DP1 on a monthly basis. While there are no limits set for THM concentrations in the EPN, when compared to TPH EPN prescribed limits analytical results during the reporting period were consistently at low levels, so did not trigger the need for further investigation (a summary of results is provided in Appendix G3).

Inline monitoring improvements

A new SWAN AMI SAC254 analyser installed on the WWRP outfall during the previous reporting period at monitoring point I1, has:

- Given continuous UV absorption measurement with the possibility to monitor the organic load of the WWRP discharge;
- permitted early identification of out-of-specification water quality within the WWRP discharge;
- allowed for correlations of the UV absorption to organic carbon related parameters (DOC, TOC and BOD) and changes in parameters (e.g. pH and DO);
- improve identification of trends to enable better control of WQ during times of low flow from the WWRP; and hence
- improved manual operation of the WWRP outlet valve.

6.5 TREATED STORMWATER DISCHARGE (DP2)

Treated SW discharged from the SW pond via DP2 was sampled on a quarterly basis. Field observations typically noted it to be clean and clear with no oil on the surface.

Laboratory analysis of SW discharge samples showed all parameters to be within EPN limits, except for the February 2020 sample which had elevated levels of:

- BOD at 20 mg/L [compared to EPN limit of 15 mg/L]; and
- TPH C_{10}-C_{36} fraction (sum) of 670 mg/L [compared to EPN limit of 500 mg/L].

Field notes reported the flow from the SW pond to be minimal after a recent rain event, but clean, clear and free of oil on the surface. This may have been associated with oil entrainment in surface run-off from the nearby highway, or release of accumulated, stagnant water after prolonged containment in the pond. The EPA was notified of this isolated non-compliant release from DP2.

A summary of quarterly SW WQ results for the reporting period is provided in Appendix G4.

Stormwater pond improvements

Accumulated sediment and plant growth within the SW pond were cleaned out as part of the v-notch weir construction works in February and March 2019 (previous reporting period). While telemetry instrumentation was installed as part of the v-notch weir construction works, it was not completed in time to enable the DP2 flow rate to be monitored during the 2019/20 reporting period.

6.6 RECEIVING ENVIRONMENT MONITORING

6.6.1 Water temperature comparison

The discharge water temperature at DP1 (and inline at I1 and I2) were consistently within the prescribed $^{+}/_{-}$ 7 degrees Celsius of the ambient water temperature (EPN Condition E4) measured at NS locations within DB.

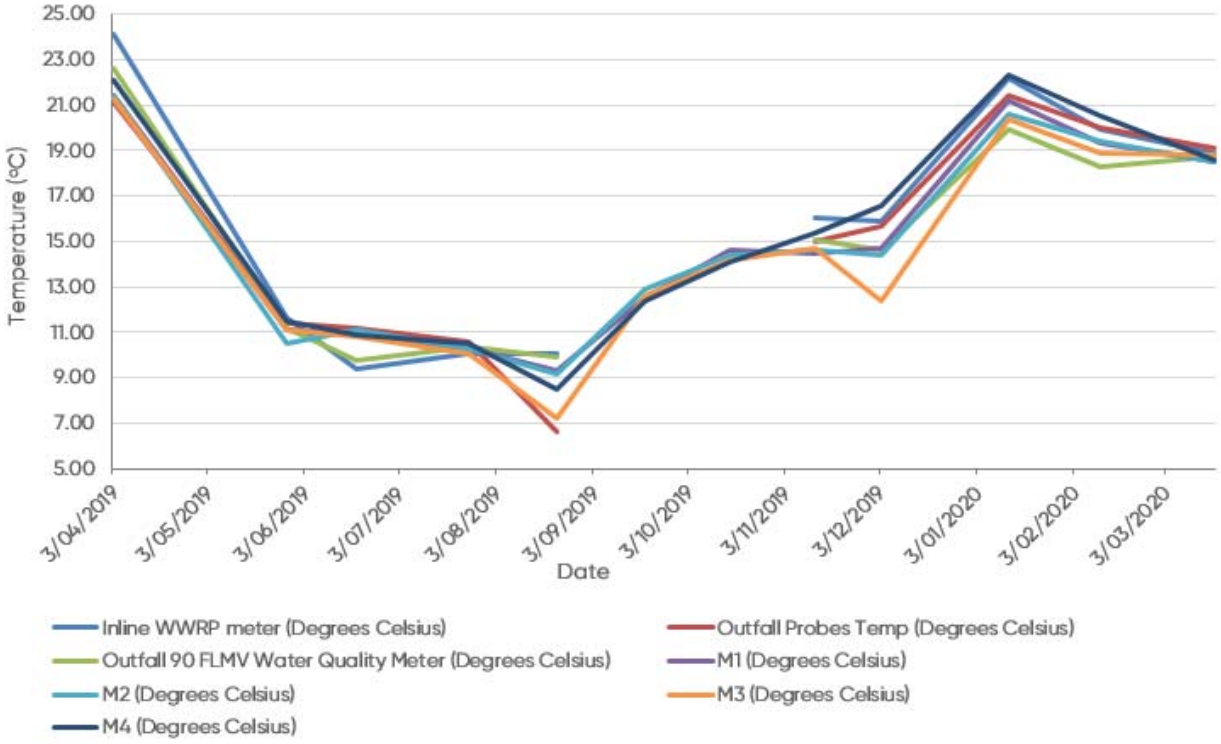
No inline and outfall temperature data or samples was collected in:

- September 2019 due to the maintenance shut; nor

- October 2019 due to continued period of WWRP outlet valve closure for pond refilling, i.e. no WWRP discharge.

Figure 6: Water temperature comparison (near shore, inline and outfall DP1)

(EPN Condition E4 requires DP1 to be +/- 7 degrees Celsius of the ambient water temperature)



6.6.2 Donovans Bay ambient water quality monitoring (D1 to D4)

Both the treated WW from the TVPS operation (DP1) and treated SW (DP2) discharge into DB. The Bay has a wide opening onto the well flushed Tamar Estuary.

Water samples collected from within DB and background sites during the reporting period on a quarterly basis have been analysed in the field using a hand-held meter [pH, DO, oxidation reduction potential (ORP), conductivity and turbidity] and through analysis of collected samples provided to NATA accredited laboratory (chlorophyll-a and nutrients).

It should be noted that COVID-19 restrictions prevented the March 2020 quarterly monitoring event (i.e. there are no results for the final quarter of this reporting period for DB monitoring). EPA approval for an exemption relating to this event was sought and granted (EPA, 2020; Appendix D).

The potential impact of the TVPS on the WQ of the receiving environment is assessed through comparison of:

- Concentrations within DB (D1 - closest site to the WW discharge point; D2 - approximately 50 to 75 m to the west of D1);
- Concentrations within the Tamar River (D3 - control site in Dirty Bay: D4 - near Wilmores Bluff);
- Estuarine and marine WQ for aquatic ecosystems within South-East Australia (ANZECC & ARMCANZ, 2018); and
- Local WQ targets for the Tamar Estuary and Esk Rivers (TEER) in Zone 3 (estuarine) and Zone 4 (marine zone) (NRM North, 2016).

The results for the reporting period are provided in Appendix G5, together with graphs and seasonal trends for individual parameters at one metre above the estuarine /marine floor (1mA) and one metre below the surface (1mB). A summary of these results is provided in Table 13, showing:

- The range of values for each parameter across both sampling depths (1mA and 1mB),
- Comparison of results with background and TEER trigger limits (TL) for marine and estuarine environments; plus
- Provision of a comment regarding the potential of DP1 discharge to be impacting on the receiving environment. Graphs for several parameters have been included as supporting information (Figures 7, 8 and 9).

Table 13: Donovans Bay (receiving environment) water quality summary during AER reporting period

MONITORING PARAMETER	RANGE AT D1 (both depths 1mA and 1mB)	COMPARISON D1 TO BACKGROUND LEVELS (D3 and D4)	COMPARISON TO TEER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENTS
pH	7.65 to 8.63 pH units	pH levels are generally relatively similar across all sites and depths. Levels at D1 and D2 have some deviation from background on a couple of occasions, so have potential for minor localised impact.	Consistently within the TEER marine upper TL (pH 8.4 pH units) and TEER estuarine lower TL (pH 7.3 pH units).	Low	Within acceptable pH limits but has potential for minor localised impact on WQ by D1 at 1mB (refer to Figure 7).
Dissolved Oxygen	71.8 to 82.7 % saturation	DO is generally below background as measured at D3 (Big Bay).	DO is typically between the TEER marine upper TL (102.2 % saturation) and TEER estuarine lower TL (78% saturation). The DO was outside of this range on the following occasions: ▪ D1 1mB and D1 1mA on 18 June 2019 with both at concentrations below the estuarine lower TL, but not too dissimilar from background so is not cause for investigation. ▪ DI 1mA was 71.8% on 9 December 2019, below the TEER estuarine lower TL. At this time, the DO was not influenced by DP1 discharge as the WWRP outlet valve was closed from 6 to12 December 2019.	Low	Refer to Table 14 for further discussion in relation to near shore results collected within the Bay and their comparison as shown in Figure 10.
Field Conductivity	33,938 to 45,769 µS/cm	Close correlation of D1 with other sites, typically at or close to background.	No TEER limits.	Low	
Turbidity	1.0 to 3.9 NTU	D1 was below background in June and Sept 2019.	While turbidity at D1 can be slightly higher than recorded at other sites and depths, it tends to trend in a	Low	

MONITORING PARAMETER	RANGE AT D1 (both depths 1mA and 1mB)	COMPARISON D1 TO BACKGROUND LEVELS (D3 and D4)	COMPARISON TO TEER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENTS
			similar manner and is consistently at levels below TEER marine upper TL (5.1 NTU).		
Chlorophyll-a	<1 mg/m^3	Chlorophyll-a levels within the Bay at D1, D2 and D3 were below the laboratory detection limit and at or below background (which was <1 or 1 mg/m^3).	It is noted that the laboratory detection limit is above the TEER marine upper TL of 0.7 mg/m^3, so it is not possible to conclusively state if levels are within the TEER TL.	Low	The ALS laboratory now has a lower detection limit of 0.5 mg/m^3 available. This lower detection limit will be requested for future monitoring events.
Ammonia-N	<0.01 to 0.14 mg/L	D1 is consistently at levels below those recorded at background (D4).	No TEER limits.	Low	Refer to Table 14 for further discussion in relation to near shore results collected within the Bay and comparison of results in Figure 11.
Nitrite and Nitrate	<0.01 to 0.06 mg/L	D1 is consistently at levels equal to, or below, background (D4).	No TEER limits.	Low	Refer to Table 14 for further discussion in relation to near shore results collected within the Bay and comparison of results in Figure 12.
Total Nitrogen	<0.1 to 0.5 mg/L	D1 is below background, except for 9 December 2019 (0.5 mg/L). At this time, the TN was not influenced by DP1 discharge as the WWRP outlet valve was closed from 6 to12 December 2019.	While Total Nitrogen (TN) was consistently well above the TEER marine upper limit (0.034 mg/L), the levels were similar to that recorded in previous years.	Low	Background levels (D3 and D4) are considered to be the most accurate measure for comparison, as the TEER TN limit value is consistently, notably different from the actual background levels recorded within this section of the Tamar River. Potential for adverse impact during the 2019/20 AER reporting period is low as D1 was consistently below background concentrations when under normal operating conditions (Refer to Figure 8).

MONITORING PARAMETER	RANGE AT D1 (both depths 1mA and 1mB)	COMPARISON D1 TO BACKGROUND LEVELS (D3 and D4)	COMPARISON TO TEER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENTS
Total Phosphorus	0.10 to 0.18 mg/L	D1 closely correlated with background.	While total phosphorus (TP) was consistently well above the TEER marine upper limit (0.036 mg/L), the levels were similar to that recorded in previous years. As for TN, the TEER TP limit is notably different from the actual background levels recorded within this section of the Tamar River, so background levels are the most accurate measure for comparison.		D1 is consistently at levels that are comparable to background, so potential for adverse impact is low (Refer to Figure 9).

Figure 7: Donovans Bay pH (1mB AND 1mA)

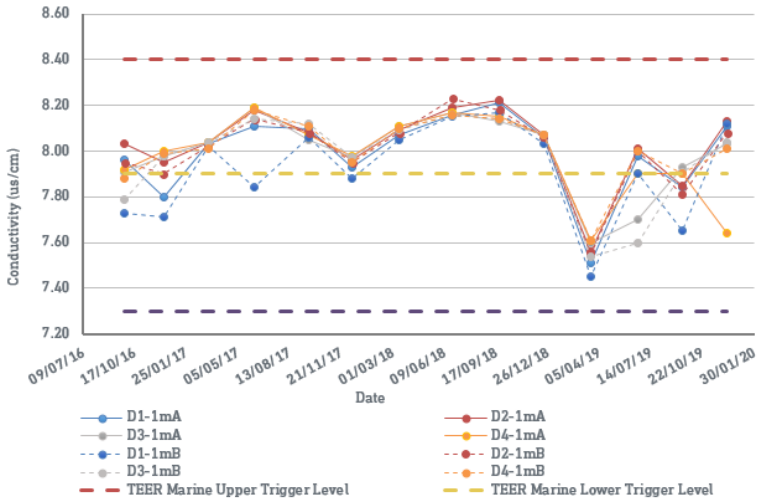


Figure 8: Donovans Bay total nitrogen (1mB and 1mA)

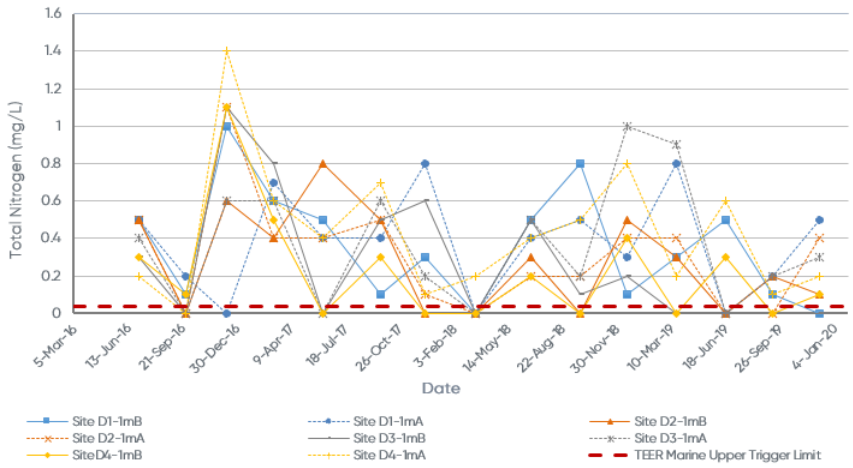
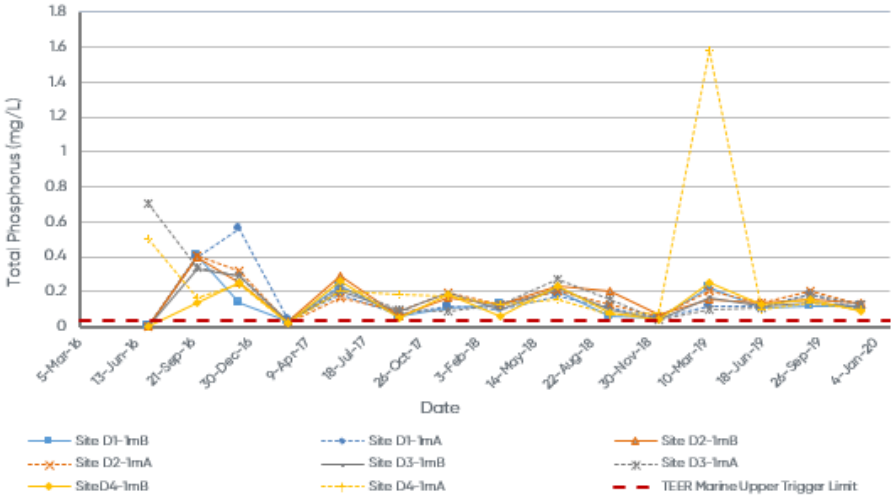


Figure 9: Donovans Bay total phosphorus (1mB and 1mA)



6.6.3 Voluntary near shore water quality monitoring (M to M4)

In addition to the quarterly DB receiving environment monitoring, AETV continues to voluntarily monitor WQ within the NS environment on a monthly basis. This has been undertaken as a precautionary measure to facilitate early detection of potential issues within the Bay should they arise (prior to 2015, this monitoring was a requirement of the EPN).

The NS WQ monitoring locations are as follows:

M1 – in the shallow top corner of DB adjacent to the highway and golf course.

M2 – in the shallows near the SW pond discharge point (DP2).

M3 – near the WWRP outfall (DP1).

M4 – in the shallows of Big Bay (background).

A summary of these results is provided in Table 14, showing:

- The range of values for each parameter as measured at NS location M3;
- The range of values for each parameter as measured at background (M4);
- Comparison of M3 values to TEER upper and lower TLs for marine and estuarine environments; and
- Provision of a comment regarding the potential of DP1 discharge to be impacting on the receiving environment. Graphs for several parameters are included as supporting information (Figures 10, 11 and 12).

Findings of this NS WQ during the reporting period are summarised in Table 13, with provision of:

- Ranges of values recorded for parameters pH, DO, Chlorophyll-a, temperature and nutrients (ammonia-N, TN and TP) as measured at:
  - M3 closest to the DP1 discharge point; and
  - M4 (background).
- An average of DB results as recorded for both depths (1mA and 1mB), across all sample locations (D1 to D4); and
- TEER estuarine and marine TLs.

Refer to Appendix G6 for the NS results and graphs for selected parameters.

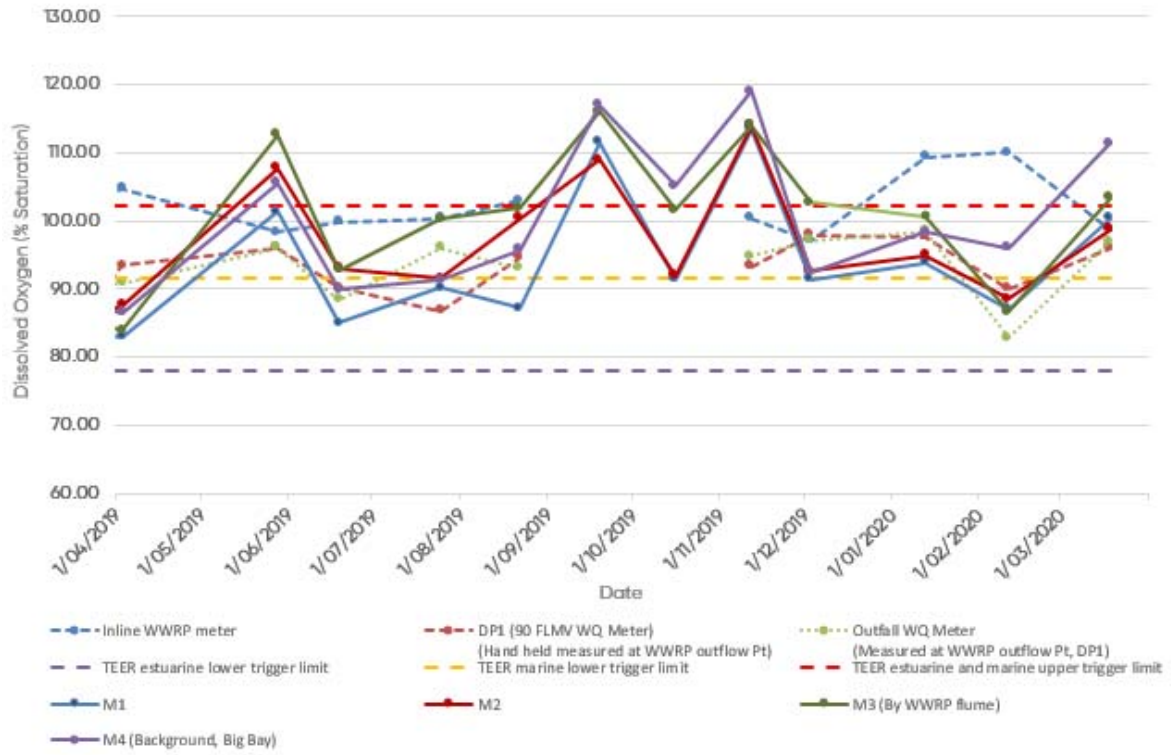
Table 14: Near Shore (receiving environment) water quality summary during AER reporting period

MONITORING PARAMETER	RANGE AT M3	RANGE AT M4 (BACKGROUND)	HIGHEST AVERAGE OF D1-D4 (BOTH DEPTHS)	COMPARISON TO TEER ESTUARINE AND MARINE TRIGGER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENT
pH	7.75 to 8.27 pH units	7.74 to 8.28 pH units	8.12 pH units	NS pH levels within both DB at sites M1 to M3 and at the control site (M4) were all within the TEER pH range of 7.3 to 8.4 pH units.	Low	
Dissolved Oxygen	83.90 to 116.00 % saturation	86.50 to 117.00 % saturation	95.9 % saturation	Figure 10 compares the DO in discharge WW (measured inline, grab sample at the outfall DP1 and inline outfall) to the NS monitoring points, showing DO: ▪ In grab samples collected at DP1 to be within TEER marine and estuarine TLs (78 to 102.2 % saturation); ▪ At M3 near the DP1 outfall to be within TEER marine and estuarine TLs (78 to 102.2 % saturation), except during May, September and October 2019 when influenced by prevailing wind; ▪ Inline WWRP meter readings to be higher and often above the TEER upper TL due to turbulence within the discharge pipe; and ▪ At NS and control (Big Bay) locations to be above the TEER estuarine and marine upper TLs.	Low	
Chlorophyll-a	<1 to 2 mg/m^3	<1 to 4 mg/m^3	-	Chlorophyll-a is reported as <1 mg/m^3, so it is not possible to assess compliance with the 0.7 mg/L marine upper TL. Chlorophyll-a concentrations at M3 (nearest to DP1) were consistently equal to, or below levels recorded at M4, or below the analytical detection limit (<1 mg/m^3), with one exception on 19 June 2019 when Chlorophyll-a was recorded to be 2 mg/m^3, compared to <1 mg/m^3 at all other sites (including background).	Low	Chlorophyll-a concentrations suggest eutrophication is not occurring.

MONITORING PARAMETER	RANGE AT M3	RANGE AT M4 (BACKGROUND)	HIGHEST AVERAGE OF D1-D4 (BOTH DEPTHS)	COMPARISON TO TEER ESTUARINE AND MARINE TRIGGER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENT
Temperature	7.20 to 20.40 °C	8.50 to 22.30 °C	15.37 °C	-	Low	The temperature range at M3 is similar to that at background and within the EPN prescribed range of +/- 7degrees of ambient (Figure 6).
Ammonia-Nitrogen	0.01 to 0.14 mg/L	<0.01 to 0.11 mg/L	0.09 mg/L	Concentrations at M3 and within DB were always below or just above those recorded at M4 (background). Further discussion is provided with Figure 11. These minor elevated concentrations are considered comparable to those within the free-flowing Estuary when the reduced flows and flushing of the Bay is taken into account.	Low	While there is potential for localised intermittent impact of ammonia-N within DB on occasion, results recorded over several years show concentrations tend to trend in a similar manner and range across all the monitoring sites, so the potential for adverse long-term impact is considered to be low.
Total Nitrogen	<0.1 to 0.60 mg/L	<0.1 to 1.60 mg/L	0.46 mg/L	Historical monitoring results for TN at all NS monitoring locations have consistently been below the TEER marine upper limit of 0.034 mg/L and D1-D4 average (0.46 mg/L) for eleven of the twelve monitoring events (Figure 12). The one exception was on 18 March 2020, when a TN concentration of 0.80 mg/L was recorded. Investigation has ascertained that the WWRP outlet valve was closed on that day, so this elevated result is likely to be associated with accumulation of nutrients in the shallows, biological breakdown of organic sedimentary material, or tidal influences. TN concentrations have typically ranged from below detection to 1.60 mg/L during the reporting period. The	Low	There is potential for localised intermittent impact of TN within DB but with consideration of Chlorophyll-a monitoring results, there are current signs of long-term deterioration of the Bay's health.

MONITORING PARAMETER	RANGE AT M3	RANGE AT M4 (BACKGROUND)	HIGHEST AVERAGE OF D1-D4 (BOTH DEPTHS)	COMPARISON TO TEER ESTUARINE AND MARINE TRIGGER LIMITS	POTENTIAL FOR IMPACT	ADDITIONAL COMMENT
				1.6 mg/L result was recorded at the control site M4 on 3 December 2019 (after two days of light rain).		
Total Phosphorus	<0.05 to 0.22 mg/L	<0.05 to 0.27 mg/L	0.2 mg/L	As shown in Figure 13: ▪ All NS monitoring locations (including background) were below the TEER upper marine TL of 0.36 mg/L during the reporting period. ▪ M3 (nearest to the DP1 outfall) was below the calculated D1-D4 average to December 2019 of 0.2 mg/L. ▪ TP concentration in treated discharge from DP1 is typically within acceptable limits.	Low	Treated discharge from DP1 is not considered to be a significant contributor to the TN levels within DB.

Figure 10: Comparison of dissolved oxygen measured in outfall and at near shore locations



Near shore ammonia-N

DP1 discharge WQ was compliant for ammonia-N concentrations for 11 of the 12 monthly results, with an elevated concentration (0.98 mg/L compared to EPN limit of 0.5 mg/L) recorded on 28 May 2019. In the absence of a TEER TL, the calculated average for historical DB monitoring results across all monitoring sites (D1-D4) to December 2019 was adopted for comparison. The M3 result on this occasion was still under the highest average ambient result for D1 to D4 results, so was considered not to have adversely impacted on the health of DB. A summary of NS analysis results is provided in Appendix G6.

While NS ammonia-N concentrations were recorded at M3 (nearest the outfall) to have been above the D1-D4 average during the reporting period on three occasions (3 December 2019, 11 February 2020 and 18 March 2020), DP1 was unlikely to have been a significant contributing factor, as on:

- 3 December 2019, there had been no discharge via DP1, as the WWRP outlet valve had been closed since 29 November 2019 (i.e. for five days);
- 11 February 2020, there was a low discharge flow via DP1 (Unit 201 was offline), with some contribution of ammonia-N from DP1 discharge (ammonia-N concentration in DP1 was 0.06 mg/L compared to the EPN limit 0.5 mg/L), with both the background levels for D1-D4 average and at M4 recorded to be 0.09 mg/L; and
- 18 March 2020, there had been no discharge via DP1, as the WWRP outlet valve had been closed since 10 March 2020 (i.e. for nine days).

While ammonia-N concentrations within DB are considered to be at levels comparable with the ambient environment, it is possible that nutrients are accumulating in the shallows (e.g. M1 and M3 when DP1 is not discharging), and/or biological reactions are occurring in that area are influencing ammonia-N concentrations (e.g. breakdown of organic material).

This may be occurring at M1, as the peak in ammonia-N concentrations recorded at M1 on 16 October 2019 were when there had been no:

- Discharge from DP1 for two-day period (i.e. since 14 October 2019) as the WWRP outlet valve had been manually closed; and
- No rainfall for the five days preceding the monitoring event to convey an input from the catchment.

Figure 11: Near shore ammonia-N concentrations compared to DB concentrations

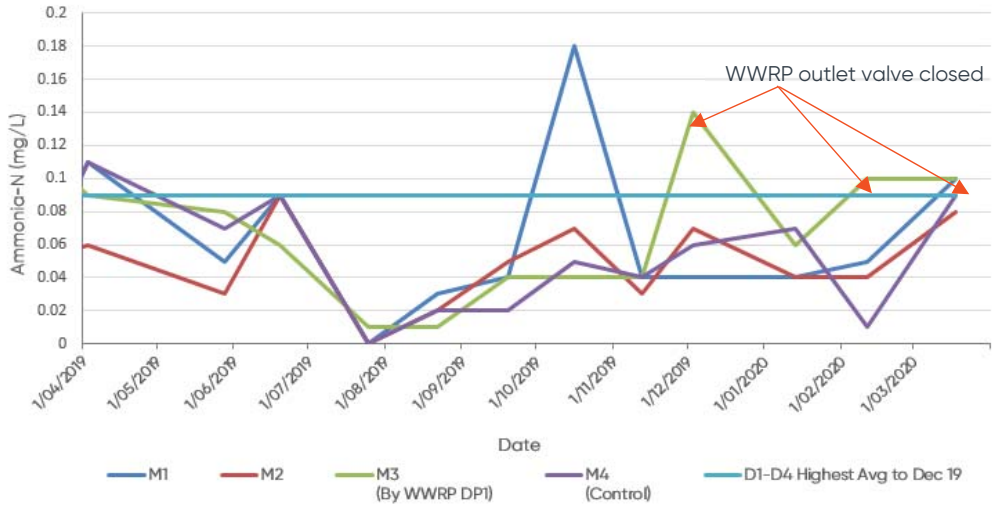


Figure 12: Review of near shore ambient total nitrogen levels

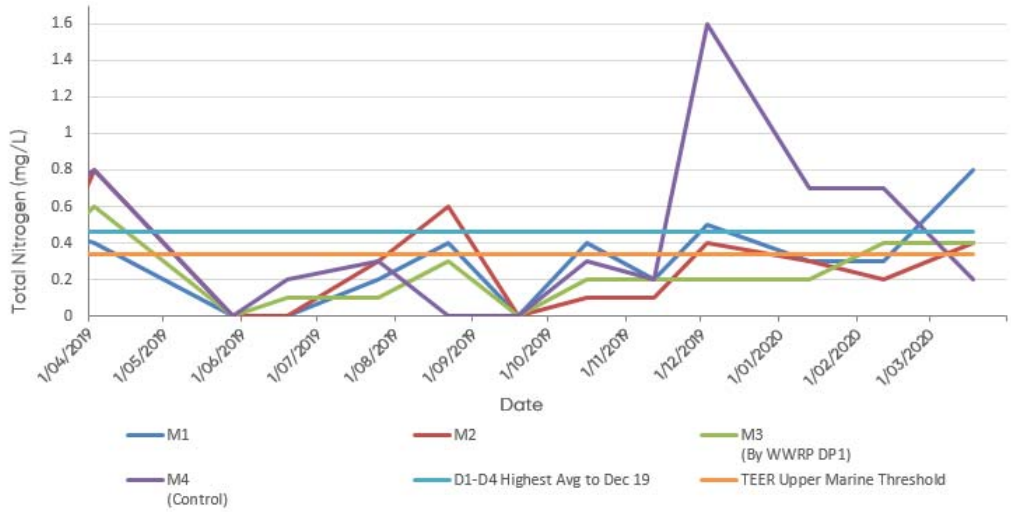
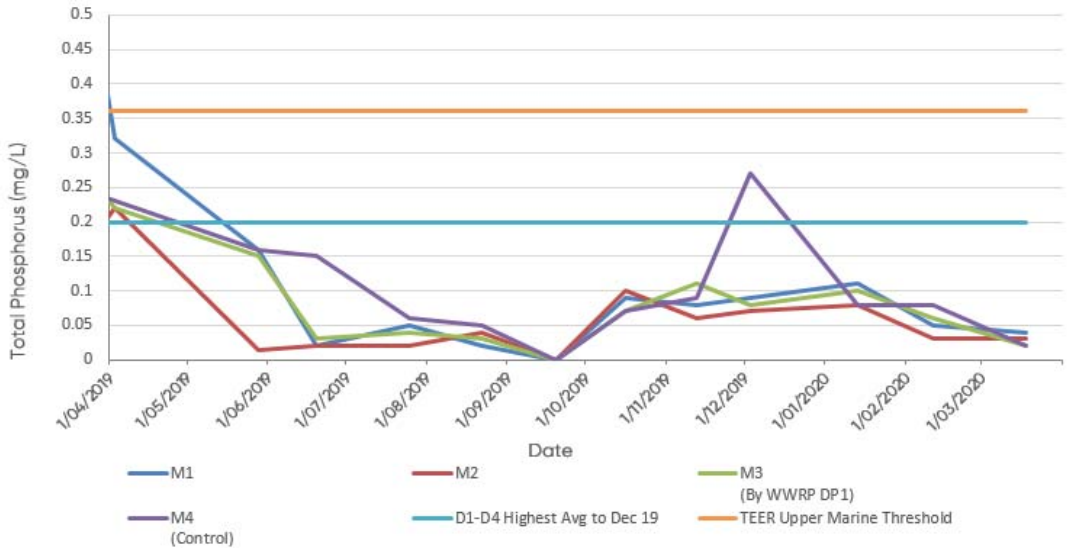


Figure 13: Near shore ambient total phosphorus levels



6.7 SITE INSPECTIONS AND AUDITS (INTERNAL AND EPA)

6.7.1 Site Audit by EPA

A scheduled compliance audit of the operation was undertaken by an Officer of the EPA on 29 April 2019 (EPA, 2019a; Appendix H).

Of the 44 EPN conditions audited, three were recorded as having minor non-compliance.

These minor non-compliance findings are summarised in Table 15 below. They relate to events which occurred during the previous twelve-month reporting period, and consequently were addressed in the previous AER.

6.7.2 AETV Site Inspections

During the reporting period, AETV continued to conduct routine daily inspections of the TVPS plant, with monthly inspections conducted concurrently with monthly WQ sampling. The monthly site inspections during the reporting period noted:

- WWRP and outfall WQ meter readings (inline, portable and outfall sample);
- WWRP and outfall access, general operational issues and tide status;
- NS portable WQ meter readings;
- Periodic (monthly) site walkover daily inspection observations; and
- SW pond and outflow conditions.

In addition to recording the effective daily operation of the TVPS, the site inspections identified the following issues during the reporting period that required remedial works:

- The timing of a water seep reappearing near the WWRP.
- Audits of accumulated material in laydown areas to identify excess items for removal (recycling or disposal) and improved storage of the remainder for future use.
- Areas of vegetation and weeds requiring management and/or control.

.

Table 15: Summary of minor non-compliance audit findings (EPA, 2019a; Appendix H)

MINOR NON-COMPLIANCES	*EPN CONDITION* AND EPA FINDINGS
Emission limits	*Condition A2 (2) provides regulatory emission limits for nitrous oxides (NO_X) for each of the turbines when operating on natural gas or diesel.* The audit identified that: ▪ There was one exceedance measured from Unit 104 Rolls Royce Trent turbine (result 62 mg/m^3, limit 60 mg/m^3) during the scheduled March 2019 stack testing event. ▪ AETV acted swiftly, taking the turbines off-line, investigating and addressing the cause of the exceedances and then verifying compliance. ▪ No further action is required.
Stack testing frequency	*Condition A3 (1) requires stack tests for new gas turbines to be conducted within 2 months of commissioning, then quarterly thereafter.* The audit noted that: ▪ On 3 April 2014, AETV received approval from the Director to undertake stack testing of Unit 201 Mitsubishi CCGT power plant on a quarterly basis only during the period that it is producing power for export to the grid. ▪ In March 2019, Unit 201 was at short notice (outside the control of TVPS) put into dry lay-up just days before the scheduled end of March stack testing. ▪ AETV has engaged a second stack emissions testing service provider to improve the capability to undertake stack testing at short notice if unexpected start up or shut down occurs. ▪ AETV has purchased a portable flue gas analyser that can measure nitrous oxide emissions for the purposes of conducting internal monitoring. ▪ Modifications have been planned for next year's budget to allow internal monitoring from the ground where turbines currently require the hire of an elevated work platform to complete stack testing. ▪ No further action is required.
Emission limits	*Condition E1 (3) requires concentrations in discharged wastewater of certain substances to not exceed specified limits at specified discharge points.* The audit noted that: ▪ AETV reported occasional exceedances for BOD (x2), free chlorine (x2), TP (x1), ammonia (x1) and TSS (x4) from discharged WW at DP1. All but one exceedance occurred when the raw water source was from the (untreated) Curries River water supply over the summer months, when water from the treated Chimney Saddle supply becomes unavailable. ▪ The WW (DP1) discharge limits and design of the TVPS water treatment plant were based on a blended supply of treated and untreated water over the drier months, not for 100% untreated water from Curries River as supplied by TasWater over these periods. ▪ The Curries River water requires additional treatment to meet the plant WQ requirements which ultimately results in higher concentrations of contaminant loading reporting to the WWRP and DP1. ▪ AETV has installed inline monitoring for BOD at the WWRP discharge that will provide trending and trigger action should elevations occur. ▪ AETV is installing a silt boom around the WWRP inlet to reduce the discharge of TSS - the main cause of exceedances reported in the 2017-18 AER.

7. SUMMARY OF FINDINGS

AETV operated the TVPS in an environmentally conscious manner during the 2019/20 reporting period, to meet and where possible exceed the requirements of the EPN and AETV commitments as outlined in previous AERs.

The environmental performance of the operation during the past twelve (12) month reporting period (1 April 2019 to 31 March 2020) is outlined in this AER. In brief:

- Operation of power generating equipment has been intermittent, with Unit 201 offline for most of the reporting period as other Hydro Tasmania stations have provided the majority of power for State demand;
- The limited and as needed use of power generating equipment has made it difficult to plan NOx air emissions testing of all equipment in operation on a quarterly basis;
- Where testing of NOx in stack emissions to atmosphere has been possible, they have all been within acceptable limits when the TVPS was operated under normal load conditions;
- Noise emissions associated with the TVPS operation were managed within acceptable levels such that nearby noise sensitive receptors have not been adversely impacted;
- The treated WW discharge flow rate via DP1 has been compliant when under normal operating conditions, with prolonged periods of low flow due to Unit 201 and associated CTs being offline.
- The WQ of treated WW emissions released via the authorised outfall DP1 to DB met EPN requirements when the TVPS was operated under normal load conditions;
- Additional manual measures were implemented as needed to manage intermittent out-of-specification WQ within the WWRP due to low water throughput during prolonged periods with Unit 201 offline;
- The WQ of treated SW discharged to DB via the authorised outfall DP2 was consistently managed within acceptable limits, with one isolated non-compliance relating to oil potentially from surface run-off.
- NS ambient WQ monitoring has identified occasional accumulation of ammonia-N, TN and TP which may relate to localised influence of discharged treated WW from DP1, accumulation in the shallows, tidal influences, natural generation through breakdown of benthic organic material within the Bay, or catchment inputs.
- Monitoring of Chlorophyll-a shows concentrations to be consistently below detection levels (<1mg/m^3) and background, suggesting the levels of nutrients present are not supporting algal growth and adversely impacting on WQ within the Bay.

In summary, WQ results for treated WW discharges from the TVPS via DP1 were generally within permitted levels. The WQ results for the receiving environment of DB shows no significant adverse impacts and typically express comparable concentrations for measured parameters to that of the marine-estuarine environment of the Tamar River.

8. UPDATED COMMITMENTS

The commitments outlined in Table 16 below are in addition to those prescribed in the EPN. These commitments relate to ongoing measures, specific environmental and maintenance improvement works for implementation during the 2019/20 AER reporting period and works for implementation in the future which will be reported in the next AER.

In addition to these commitments, the following notable maintenance activities are proposed for implementation over the next twelve (12) month reporting period:

- Annual TVPS maintenance shut will not go ahead in 2020/2021 due to lack of run time on Unit 201.
- Routine outages for each of the power generating units including:
  - Unit 201 will undergo annual statutory and regulatory inspections as required to maintain equipment ready for use should circumstances change;
  - Unit 104 will have regulatory and statutory inspections carried out in April 2020, COVID-19 restrictions permitting; and
  - FT8's Units 101, 102 will have regulatory and statutory inspections carried out in September/ October/ November 2020 respectively

Table 16: Summary of additional commitments for implementation

	ISSUE	COMMITMENTS	STATUS OF IMPLEMENTATION IN 2019/20	ACTIONS FOR 2020/21
	Noise Control			
1	Ongoing operation of (and recalibration as needed) of a permanent noise monitoring station next to the site to provide ongoing noise emission monitoring data for the operation and assist with trouble shooting any noise issues or complaints. Further investigation may be required if noise complaints are received.	▪ AETV will continue to operate (and recalibrate as needed) the permanent noise monitoring station.	▪ Actions continued to be undertaken as described, they are ongoing. ▪ No noise issues required implementation of additional management measures.	▪ Implementation of commitment is ongoing.
2	While an annual environmental noise survey was completed in April / May 2020 it was in response to the delayed 2018/19 survey, so was reported in the previous AER report. A second survey was scheduled to be undertaken in February / March 2020 when all power generating equipment was in operation. This was not able to be undertaken due to unforeseen COVID-19 restrictions and limited operation of power generating equipment.	▪ AETV will organise for an annual environmental noise survey to be undertaken as soon as all power generating equipment is expected to be operational.	▪ AETV had scheduled March 2020 survey but had to cancel it as COVID-19 restrictions did not permit external consultants' access to the site at that time and there was limited power generating equipment in operation. ▪ AETV sought, and was granted, an exemption for the noise survey as a result of COVID-19 restrictions (EPA, 2020).	▪ Survey to be undertaken at the next suitable opportunity, or at latest March 2021.
	Monitoring of water seep near the WWRP			
3	In October 2013, seepage water was observed at the lower end (foot) of the south-western wall of the WWRP. Investigation of the WWRP liner integrity during annual maintenance shuts has eliminated the WWRP as a source of water for this seep. AETV identified pipework and manhole cover seals to the WWRP as possible sources of the leak as the seep appears to occur when water level in the WWRP is high. This infrastructure was repaired during 2018/19. The T-connector has been identified as a possible source of the water seep, so the WWRP water level is now being maintained at a lower level to minimise this potential source.	AETV will continue to: ▪ Maintain the WWRP water level 20 centimetres below the pond overflow level; ▪ Visually monitor the periods of re-emergence of the seepage water along the south-western wall of the WWRP; ▪ Visually monitor painted cracks in the CT basin to detect notable changes; ▪ Inspect WWRP related infrastructure (WWRP liner, pipework, manhole cover seals) regularly to identify possible sources of the seep; and	▪ Commitment actions continued to be undertaken as described, they are ongoing. ▪ Further repair work was undertaken on WWRP related pipework and manhole cover seals. ▪ There was a reduction in the appearance of the seep during 2019/20, with it only being observed during December 2019 and January 2020 monthly site inspections. The joint in the liner around the inlet pipework was investigated and its integrity thought to be ok.	▪ Implementation of commitment is ongoing. ▪ AETV plan to raise the height of the WWRP manhole to address the leak.

	ISSUE	COMMITMENTS	STATUS OF IMPLEMENTATION IN 2019/20	ACTIONS FOR 2020/21
	The presence and extent of the seep / trickle of water has continued to be monitored visually during monthly field inspections. It has continued to be present intermittently during the reporting period, appearing as a non-odorous, wet patch or minor trickle of clear water and is more prominent when the WWRP water level is high. The flow has not been enough to collect a sample for analysis. While initial observations suggest that the intermittent seep is not highly contaminated (nor crossing the site boundary), investigation will continue as it is an unapproved water discharge.	▪ Undertake further repair work as needed.	▪ Further investigation identified the WWRP manhole to be leaking when the level was high (i.e. when filled within 20 centimetres of the overflow level).	
	WWRP Wastewater quality and monitoring			
4	TPH have been recorded intermittently in WWRP discharge for a number of years and could be a result of possible inputs from: i. Presence of THMs in treated Chimney Saddle water; ii. Hypochlorite treatment of WW to break down to THMs when in contact with organic matter; and iii. a proprietary polymer (which contains TPH) AETV add to the CT water to flocculate and enable skimming of particulates from the wastewater stream when operating on Curries River water. In previous years, periods of elevated THMs correlated with use of Curries River water. This is due to the higher rate of hypochlorite use when the TVPS is operated on untreated raw water, and hence generation of THMs.	▪ AETV will continue to voluntarily monitor WW for the presence of TPH and THMs in discharge and ambient water when operating on water supplied from the Curries River Dam.	▪ Actions continued to be undertaken as described, they are ongoing. ▪ There was improved control of TPH and THMs during the reporting period. ▪ There were no concerns regarding concentrations of these parameters regardless of the water supply. This may, however, be a reflection of the low water use and limited operation of power generating equipment during this reporting period.	▪ Implementation of commitment is ongoing.
	Wastewater Retention Pond Desludging Operations			
5	AETV has installed and been operating inline (I1 and I2) and outfall (DP1) meters [pH, conductivity, temperature, DO, conductivity and UV absorption (recently installed at I1)] to measure WQ in treated WW being discharged to DB. An additional inline probe (SWAN AMI SAC254 analyser) has been installed on the outlet of the WWRP to improve monitoring of DOC, TOC and BOD concentrations. Identification of trends will enable better prediction of issues within the WWRP as they happen and allow for quicker response to atypical operating conditions (e.g. manual closure of the WWRP outlet valve and manual hypochlorite dosing).	AETV will continue to: ▪ Monitor WQ of the treated WW from WWRP being released for discharge via DP1 to DB using the inline and outfall meters; ▪ Regularly inspect and re-calibrate these monitoring devices to ensure effective operation of equipment, with replacements provided as needed; ▪ Scheduled monthly cleaning will be undertaken of probes and re-calibration with a hand-held meter; and ▪ The handheld probe is replaced on a regular basis when out of specification.	▪ Actions continued to be undertaken as described, they are ongoing.	▪ Implementation of commitment is ongoing.
6	Sludge accumulates in the WWRP and requires regular removal to ensure continued effective operation of the WW treatment system. This sludge needs to be tested to ascertain its suitability for reuse and/or approved method of disposal based on the level of contaminants it contains. A methodology was approved for dewatering and reuse of sludge for a previous desludging operation (Hydro, 2015).	When regularly removing sludge from the WWRP, AETV will: ▪ Test the concentrations (totals and TCLP) of metals in the sludge; ▪ Dewater the sludge within the concrete pad on the neighbouring Hydro BBPS site (until an alternative arrangement is established on-site); and	▪ Accumulated sludge material was removed from the WWRP during the maintenance 2019 shut. The material was tested and identified to be suitable for reuse as fill. ▪ Dewatered sludge remains from previous WWRP desludging events within a bunded area (the old tank farm) on the neighbouring former Hydro BBPS site. Its volume has significantly decreased as it dewatered, with only a minor quantity remaining.	▪ Implementation of commitment is ongoing. ▪ AETV is preparing scope of works for the potential construction of a dedicated sludge

	ISSUE	COMMITMENTS	STATUS OF IMPLEMENTATION IN 2019/20	ACTIONS FOR 2020/21
		▪ Manage the dewatering and reuse of sludge in accordance with: - The original methodology developed for a desludging operation; and - As appropriate for its soil classification based on IB105 (EPA, 2018c).	▪ This new sludge generated during the 2019 maintenance works will be place in the bunded area with previous remnant dewatered sludge material. ▪ The dewatered sludge material will remain in place until redevelopment plans for the adjacent BBPS site commence or a suitable reuse project is identified. ▪ AETV is investigating alternative arrangement for future sludge dewatering on site, as the adjacent BBPS site is under a separate land title and may be sold (i.e. may not be available for use in future).	dewatering facility on-site.
	Environmental Management System			
7	Implement an EMS for the TVPS. AETV is currently amending its existing TVPS EMS to enable merging and adoption of a Hydro EMS. This has included: • Conducting a gap analysis of AETV's EMS, related procedures and forms; • Updating the priority list of aspects and impacts; and • Setting up an action plan for the highest priority items.	AETV will continue to implement an EMS including: ▪ Implementation of identified environmental management actions in priority order; ▪ Undertaking internal reviews; and ▪ Updating the live (Hydro/AETV) document as required.	▪ Actions continued to be undertaken as described, they are ongoing.	▪ Implementation of commitment is ongoing.
	Stormwater Flow Monitoring			
8	AETV has installed a v-notch weir and ultrasonic flow meter to the storm water pond outlet. This is to enable flow monitoring of the SW pond to aid mass balance calculations and compare to flows through the WWRP.	AETV will continue to monitor flows and record in the data historian.	▪ Install v-notch weir and monitoring equipment.	▪ Commission telemetry from the flow meter to allow data to be tracked and recorded. ▪ Commission scheduled maintenance program for the flow meter ▪ Installation of a weather station monitoring rainfall,hail, temperature, barometric pressure, humidity, wind speed direction will further enhance the data collection for the site as a whole

REFERENCES

AETV, 2019	Tamar Valley Power Station, EH&S Procedure Emergency Response Plan. Proc-Site-A-EHS TVPS Emergency Response Plan Rev 1.9 (AETV, January 2019).
ANZECC/ ARMCANZ, 2000	National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Water Quality Guidelines for aquatic ecosystems). Australian and New Zealand Environment Conservation Council, and Agriculture and Resource Management Council of Australia and New Zealand. October 2000.
ANZECC/ ARMCANZ, 2018	National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Water Quality Guidelines for aquatic ecosystems). Australian and New Zealand Environment Conservation Council, and Agriculture and Resource Management Council of Australia and New Zealand. August 2018.
ANZECC/ ARMCANZ, 2018a	DGVs for aquatic ecosystems of coastal and marine waters of Tasmania. ANZECC. August 2018.
ANZECC/ ARMCANZ, 2018b	DGVs for aquatic ecosystems of estuarine waters of Tasmania. ANZECC. August 2018.
Aquenal/ DEPHA, 2008	State of the Tamar Estuary. Aquenal Pty Ltd and the Department of Environment, Parks, Heritage and the Arts, 2008.
COVA, 2019	Annual Environmental Review: 2018-2019 – Tamar Valley Power Station - Final. Project No. 2946.013. COVA Thinking Pty Ltd. Dated 16th September 2019.
EPA, 2012a	Environment Protection Notice 7898/1 issued to Aurora Energy (Tamar Valley) Pty Ltd, for the Operation of a Gas Fired Power Station at the Tamar Valley Power Station, Bell Bay, Tasmania. Environment Protection Authority Tasmania. Dated 20 Nov 2012.
EPA, 2015	Correspondence titled: "Request to vary biological monitoring requirements". EPA Manager, Environmental Operations North. Environment Protection Authority Tasmania. Dated 10July 2017
EPA, 2018a	Correspondence titled: "Annual Environmental Review 2016-17 & Change to AER submission timeframe". EPA Manager, Environmental Operations North. Environment Protection Authority Tasmania. Dated 26 March 2018.
EPA, 2018b	Correspondence titled: "Approval to undertake analyses using a non-NATA accredited laboratory". EPA Deputy Director. Environment Protection Authority Tasmania. Dated 2 July 2018.
EPA, 2018c	Information Bulletin No. 105; Classification and management of contaminated soil for disposal. Version 3. Environment Protection Authority Tasmania. Dated 2018.
EPA, 2019a	Correspondence titled: "Temporary request to operate Unit 104 Rolls Royce Trent generator above emission limit". EPA Deputy Director. Environment Protection Authority Tasmania. Dated 4 April 2019.

EPA, 2019b — Correspondence titled: "Tamar Valley Power Station, Bell Bay – Compliance Audit April 2019". Director, Environment Protection Authority. Environment Protection Authority Tasmania. Dated 31st May 2019.

Ektimo, 2019a — Emission Testing Report (Report No. R007479) (Ektimo Pty Ltd, 9th May 2019) (Units Tested: Units 104 and 201)

Ektimo, 2019b — Emission Testing Report (Report No. R007479) (Ektimo Pty Ltd, 9th May 2019) (Units Tested: Units 104 and 201)

Ektimo, 2019c — Emission Testing Report (Report No. R008047) (Ektimo Pty Ltd, 20th August 2019) (Units Tested: U101-A and U101-B)

Ektimo, 2020 — Quarter Four Compliance – 2019 Emission Testing Report (Report No. R007914) (Ektimo Pty Ltd, 23rd January 2020) [Units Tested: FT8s (U101-A, U101-B, U102-A, U102-B, U103-A) and Unit 104]

Hydro, 2015 — Tamar Valley Power Station: Proposed Sludge Disposal Methodology. Prepared by Hydro Tasmania. Dated 8th December 2015.

NPI, 2011 — National Pollutant Inventory Combustion in Boilers Manual Version 3.6 December 2011– www.npi.gov.au

NRM North, 2016 — Tamar Estuary and Esk Rivers – Tamar Estuary 2016 Report Card. Ecosystem Health Assessment Program (December 2014 – November 2015). NRM North.

TARKARRI, 2019 — Tamar Valley Power Station Environmental Noise Survey 2019 (Report No.5266_AC_R_R1) (Tarkarri Engineering Pty Ltd, May 2019)

APPENDIX A

EPA Tasmania. Environment Protection Notice No. 7898/1 (r1) Issued to Aurora Energy (Tamar Valley) Pty Ltd (20 November 2012)

ENVIRONMENT PROTECTION AUTHORITY

Level 7, 134 Macquarie Street, Hobart TAS
GPO Box 1550, Hobart, TAS 7001 Australia
Enquiries: Robert Trimble
Ph: +61 3 63362894 Fax +61 3 63362208
Email: Robert.Trimble@environment.tas.gov.au
Web: www.epa.tas.gov.au
Our Ref: EN-EM-PE-PX-110315_3 : H102397

20 November 2012

COPY

Mr Peter Davis
Chief Executive Officer
Aurora Energy (Tamar Valley) Pty Ltd
Level 2
21 Kirksway Place
HOBART TAS 7000

Dear Mr Davis

ENVIRONMENT PROTECTION NOTICE 7898/1
AURORA ENERGY (TAMAR VALLEY) PTY LTD

Please find attached to this correspondence, Environment Protection Notice (EPN) No. 7898/1 issued to Aurora Energy (Tamar Valley) Pty Ltd in accordance with Section 44(1)(d) and (e) of the *Environmental Management and Pollution Control Act 1994* (EMPCA).

The environmental conditions of Permit 7467 have effectively been replaced by the conditions set out in Schedule 2 of the attached EPN.

The grounds upon which the EPN is issued are set out in the EPN. I also draw your attention to Schedule 3 of the EPN, which contains important additional information.

The EPN is being issued to reflect the change from the construction / commissioning phases to the fully operational phase of the activity. It further reflects the necessary changes to monitoring programs and emissions limits that have become apparent as the station has moved to being fully operational.

The EPN takes effect on the day on which it is served. In accordance with s44(3) of the EMPCA, you are required to comply with the conditions contained in Schedule 2 of this EPN.

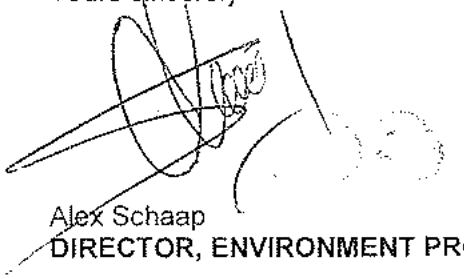
You may appeal to the Resource Management and Planning Appeal Tribunal against the EPN, or against any requirement contained in the EPN, within fourteen days from the date on which the EPN is served, by writing to:

The Chairperson
Resource Management and Planning Appeal Tribunal
GPO Box 2036
HOBART TAS 7001

Lodgment of an appeal may be subject to the payment of a fee. It is suggested that you contact the Tribunal on (03) 6233 6464 to ascertain the requirements for making an appeal.

If you have any queries regarding this correspondence, please contact the officer named at the head of this correspondence.

Yours sincerely



Alex Schaap
DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Cc Mr Tony Ciffo, Power Station Manager, Aurora Energy (Tamar Valley) Pty Ltd, 4055 East Tamar Highway, GEORGE TOWN TAS 7253

Ms Fiona Keserue-Ponte, Senior Environmental Scientist, SEMF Pty Ltd, GPO Box 897 HOBART TAS 7001

Mr Stephen Brown, General Manager, George Town Council, PO Box 161, GEORGE TOWN TAS 7253

ENVIRONMENT PROTECTION NOTICE No. 7898/1

Issued under the *Environmental Management and Pollution Control Act 1994*

Issued to: **AURORA ENERGY (TAMAR VALLEY) PTY LTD**
ACN 123 391 613
LEVEL2 21 KIRKSWAY PL
HOBART TAS 7000

Environmentally Relevant Activity: **The operation of a gas fired power station (ACTIVITY TYPE: Fuel Burning)**
TAMAR VALLEY POWER STATION, EAST TAMAR HWY
BELL BAY TAS 7253

GROUNDS

I, Alexander Schaap, Director, Environment Protection Authority, being satisfied in accordance with section 44(1)(d) and (e) of the *Environmental Management and Pollution Control Act 1994* (the EMPCA) and in relation to the above-mentioned environmentally relevant activity that:-

it is desirable to vary the conditions of a permit (see table below); and

it is necessary to secure compliance with the general environmental duty,

hereby issue this environment protection notice to the above-mentioned person as the person responsible for the activity.

Permit No.	Date Granted	Granted By
DA 2007/072	25 September 2007	George Town Council

PARTICULARS

The particulars of the grounds upon which this notice is issued are that:

1 Because the permit conditions need to be varied to reflect changed management or operations practices.

2 Because the permit conditions need to be varied to reflect current or updated terminology and/or to clarify the meaning of the conditions.

3 Because the permit conditions need to be varied to reflect current regulatory practice.

4 Because the permit conditions need to be varied to reflect continuous improvement consistent with the objectives of EMPCA.

5 The permit conditions need to be varied to ensure that there are adequate safeguards against environmental harm or nuisance being caused by the activity.

6 The permitted quantity of materials processed and/pr produced by the activity needs to be varied to reflect the maximum daily and annual wastewater discharge levels.

Further details of the particulars are contained in Schedule 4 of this notice.

DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Date of issue: 20 NOV 2012

DEFINITIONS

Unless the contrary appears, words and expressions used in this Notice have the meaning given to them in Schedule 1 of this Notice and in the EMPCA. If there is any inconsistency between a definition in the EMPCA and a definition in this Notice, the EMPCA prevails to the extent of the inconsistency.

REQUIREMENTS

In accordance with s.44(3) of the EMPCA, the person responsible for the activity is required to comply with the conditions contained in Schedule 2 of this Notice. These conditions prevail over the terms of the permit to the extent of any inconsistency.

INFORMATION

Attention is drawn to **Schedule 3**, which contains important additional information.

PENALTIES

If a person bound by an environment protection notice contravenes a requirement of the notice, that person is guilty of an offence and is liable on summary conviction to a penalty not exceeding 1000 penalty units in the case of a body corporate or 500 penalty units in any other case (at the time of issuance of this Notice one penalty unit is equal to $130.00).

NOTICE TAKES EFFECT

This Notice takes effect on the date on which it is served upon you.

APPEAL RIGHTS

You may appeal to the Appeal Tribunal against this notice, or against any requirement contained in the notice, within 14 days from the date on which the notice is served, by writing to:

The Chairperson
Resource Management and Planning Appeal Tribunal
GPO Box 2036
Hobart TAS 7001

Signed: _____

DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Date: 20 NOV 2012

Table Of Contents

Attachments

Schedule 1: Definitions

Aboriginal Relic has the meaning described in section 2(3) of the *Aboriginal Relics Act 1975*

Activity means any environmentally relevant activity (as defined in section 3 of EMPCA) to which this document relates, and includes more than one such activity

Authorized Officer means an authorized officer under section 20 of EMPCA

Best Practice Environmental Management or '**BPEM**' has the meaning described in Section 4 of EMPCA.

CCGT Combined Cycle Gas Turbine

commissioning means the period from the date of initial testing of each new gas turbine, to the date the permit holder has certified official acceptance of that gas turbine as complying with the permit holder's performance specifications.

Director means the Director, Environment Protection Authority holding office under Section 18 of EMPCA and includes a person authorised in writing by the Director to exercise a power or function on the Director's behalf.

DRP means Decommissioning and Rehabilitation Plan

Emergency Response And Contingency Plan means the most recent verion of the plan as submitted to the Director in the Annual Environmenal Review.

EMP means the Tamar Valley Power Station Development Proposal and Environmental Management Plan prepared by Alinta Energy Pty Ltd dated June 2007.

EMPCA means the *Environmental Management and Pollution Control Act 1994.*

Environmental Harm and **Material Environmental Harm** and **Serious Environmental Harm** each have the meanings ascribed to them in Section 5 of EMPCA.

Environmental Nuisance and **Pollutant** each have the meanings ascribed to them in Section 3 of EMPCA.

Environmentally Hazardous Material means any substance or mixture of substances of a nature or held in quantities which present a reasonably foreseeable risk of causing serious or material environmental harm if released to the environment and includes fuels, oils and chemicals.

Eutrophication Monitoring Program means the 'Proposed Chhlophyll-a Sampling Regime for Tamar Valley Power Station' prepared by SEMF Pty Ltd dated March 2010 as approved by the Director on 29 April 2010 and as ammended from time to time with the written approval of the Director.

noise means acoustic energy as measured as sound pressure.

noise sensitive premises includes residences and residential zones (whether occupied or not), schools, hospitals, caravan parks and uses involving the presence of individual people for cxtended periods, except in the course of their employment or for recreation.

Nominated Exhaust Points means;
(1) one stack of one Pratt and Whitney Open Cycle Gas Turbine per sampling event. Each of the stacks of the three machines is to be sampled on a rotating basis.
(2) the Rolls Royce Trent Open Cycle Gas Turbine stack, and
(3) the Mitsubishi Combined Cycle Gas Turbine stack.

OCGT Open Cycle Gas Turbine.

Person Responsible is any person who is or was responsible for the environmentally relevant activity to which this document relates and includes the officers, employees, contractors, joint venture partners and agents of that person, and includes a body corporate.

Planning Authority means the Council(s) for the municipal area(s) in which The Land is situated.

Stack Test means the taking of measurements and the collection of samples for analysis from within a chimney, stack or flue.

start-up and shut-down means
start up operations before exhaust gas temperature reaches 500 °C and for a period not exceeding 15 minutes thereafter; and
shut down operations after exhaust gas temperatures decrease below 500 °C.

Stormwater means water traversing the surface of the land as a result of rainfall.

Tasmanian Noise Measurement Procedures Manual means the Noise Measurement Procedures Manual dated July 2004 issued by the Director of Environmental Management in accordance with regulation 25 of the *Environmental Management and Pollution Control (Miscellaneous Noise) Regulations 2004* and includes any subsequent versions of the document.

The Land means the land on which the activity to which this document relates may be carried out, and includes: buildings and other structures permanently fixed to the land, any part of the land covered with water, and any water covering the land. The land falls within the area defined by:

1 CT 131620/1 and
2 land denoted as 'Lot 2' on the plan shown at Attachment 1

Waste has the meaning ascribed to it in Section 3 of EMPCA

Wastewater means all process water generated by the activity and discharged to Discharge Point 1.

Water Quality And Biological Monitoring Program means the 'Updated Tamar River and Donovans Bay Sampling Program' prepared by GHD Pty Ltd dated November 2008 and as ammended from time to time with the written approval of the Director.

Schedule 2: Conditions

Maximum Quantities

Q1 Regulatory limits

1 The activity must not exceed the following limits:

1.1 77 tonnes per hour of total capacity to consume fuel. (Annual fees are derived from this figure.)

1.2 5 megalitres per day of discharge of wastewater to Donovans Bay

1.3 550 megalitres per annum of discharge of wastewater to Donovans Bay

1.4 100 hours per 12 month period of burning of distillate fuel

General

G1 Compliance with EMP and BPEM

The Land must be developed and used, and the activity on The Land must be carried out and monitored, in accordance with the environmental management measures set down in the Environmental Management Plan ('EMP'), and in accordance with best practice environmental management, unless otherwise specificd in these conditions or contrary to EMPCA.

G2 Access to and awareness of conditions and associated documents

A copy of these conditions and any associated documents referred to in these conditions must be held in a location that is known to and accessible to the person responsible for the activity. The person responsible for the activity must ensure that all persons who are responsible for undertaking work on The Land, including contractors and sub-contractors, are familiar with these conditions to the extent relevant to their work.

G3 Incident response

If an incident causing or threatening environmental nuisance, serious environmental harm or material environmental harm from pollution occurs in the course of the activity, then the person responsible for the activity must immediately take all reasonable and practicable action to minimise any adverse environmental effects from the incident.

G4 No changes without approval

1 The following changes, if they may cause or incrcase the emission of a pollutant which may cause material or serious environmental harm or environmental nuisance, must only take place in relation to the activity if such changes have been approved in writing by the EPA Board following its assessment of an application for a permit under the *Land Use Planning and Approvals Act 1993*, or approved in writing by the Director:

1.1 a change to a process used in the course of carrying out the activity; or

1.2 the construction, installation, alteration or removal of any structure or equipment used in the course of carrying out the activity; or

1.3 a change in the quantity or characteristics of materials used in thc course of carrying out the activity.

G5 Hazard Identification

The hazard identification and risk management program dated March 2008, as ammended from time to time with the written approval of the Director, must be implemented.

G6 Complaints register

1 A public complaints register must be maintained and made available for inspection by an Authorized Officer upon request. The public complaints register must, as a minimum, record the following detail in relation to each complaint received in which it is alleged that environmental harm (including an environmental nuisance) has been caused by the activity:

1.1 the time at which the complaint was received;

1.2 contact details for the complainant (where provided);

1.3 the subject-matter of the complaint;

1.4 any investigations undertaken with regard to the complaint; and

1.5 the manner in which the complaint was resolved, including any mitigation measures implemented.

2 Complaint records must be maintained for a period of at least 3 years.

Atmospheric

A1 Stack testing facilities

1 The following stack testing facilities must be maintained at all nominated exhaust points:

1.1 sampling positions must be in accordance with Australian Standard AS 4323.1 (*Stationary source emissions - selection of sampling positions*), or as approved in writing by the Director;

1.2 safe sampling platforms must be located to allow access to the sampling positions and safe access to these sampling platforms must be provided; and

1.3 all necessary services required for the test method prescribed must be provided.

A2 Emission limits

1 Except during start-up and shut-down, the concentration of substances (given for a dry gas at 0 °C and an absolute pressure of 101.325 kPa) listed below in emissions from the nominated exhaust points must not exceed the limits specified below.

2 Emission limits (mg per cubic metre)

Machine	NO_x (expressed as 15% O_2)
Mitsubishi CCGT operating on natural gas	60
Pratt and Whitney OCGT operating on gas	70
Pratt and Whitney OCGT operating on distillate	110
Rolls Royce Trent OCGT operating on gas	60
Rolls Royce Trent OCGT operating on distillate	110

A3 Stack Testing Frequency

1 Stack tests must be carried out for any new gas turbines within 2 months of the completion of commissioning for that particular machine, and quarterly thereafter unless otherwise approved by the Director.

2 The stack of a Pratt and Whitney gas turbine must be sampled quarterly unless otherwise approved by the Director.

3 Stack tests must occur when the turbines are operating under full load and normal operating conditions.

A4 Emission limit exceedances

In the event that an emission limit is exceeded, the Director must be notified of the exceedance within 48 hours

A5 Operation of Pratt and Whitney turbines

1 Except during start-up and shut-down, or as otherwise approved by the Director, the Pratt and Whitney gas turbine units must not be operated without water injection.

2 A register of gas turbine operation without water injection must be maintained for a period of at least 3 years and be made available for inspection by an authorised officer upon request. The register must, as a minimum, record the following detail:

2.1 Gas turbine unit operated without water injection;

2.2 Date and time that operation without water injection commenced;

2.3 Duration of operation without water injection; and

2.4 Brief description of reason operation without water injection was required.

<u>Decommissioning And Rehabilitation</u>

DC1 Notification of cessation

Within 30 days of becoming aware of any event or decision which is likely to give rise to the permanent cessation of the activity, the person responsible for the activity must notify the Director in writing of that event or decision. The notice must specify the date upon which the activity is expected to cease or has ceased.

DC2 DRP requirements

Unless otherwise approved in writing by the Director, a draft Decommissioning and Rehabilitation Plan (DRP) for the activity must be submitted for approval to the Director within 30 days of the Director being notified of the planned cessation of the activity or by a date specified in writing by the Director. The DRP must be prepared in accordance with any guidelines provided by the Director.

DC3 Rehabilitation following cessation

1 Following permanent cessation of the activity, and unless otherwise approved in writing by the Director, The Land must be rehabilitated including:

1.1 stabilisation of any land surfaces that may be subject to erosion;

1.2 removal or mitigation of all environmental hazards or land contamination, that might pose an on-going risk of causing environmental harm; and

1.3 decommissioning of any equipment that has not been sold.

2 Where a Decommissioning and Rehabilitation Plan (DRP) has been approved by the Director, rehabilitation must be carried out in accordance with that plan.

DC4 Temporary suspension of activity

1 Within 30 days of becoming aware of any event or decision which is likely to give rise to the temporary suspension of the activity, the person responsible for the activity must notify the Director in writing of that event or decision. The notice must specify the date upon which the activity is expected to suspend or has suspended.

2 During temporary suspension of the activity:

2.1 The Land must be managed and monitored by the person responsible for the activity to ensure that emissions from The Land do not cause serious environmental harm, material environmental harm or environmental nuisance; and

2.2 If required by the Director, the person responsible must prepare and implement a Care and Maintenance Plan to the satisfaction of the Director.

3 Unless otherwise approved in writing by the Director, if the activity on The Land has substantially ceased for 2 years or more, rehabilitation of The Land must be carried out in accordance with the requirements of these conditions as if the activity has permanently ceased.

Discharge

DS1 Authorised Discharge Points

Wastewater and stormwater from the activity must only be discharged from the authorised discharge points, as specified below:

Authorised Discharge Point	Purpose	GPS Coordinates Northings	GPS Coordinates Eastings
Discharge Point 1 (Refer Attachment 2)	Point of discharge of wastewater to Donovans Bay	5445700	491740
Discharge Point 2 Refer Attachment 2)	Point of discharge of stormwater to Donovans Bay	5445832	491758

Effluent Disposal

E1 Emission Limits

1 The pH of wastewater discharged to Discharge Point 1 must be between 6.5 and 8.5.

2 The Dissolved Oxygen concentrations must be between 80% and 100% saturation.

3 The concentrations in discharged wastewater of substances or measures listed in Column 1 of the table below must not exceed the limits specified in Columns 3 and 4 at the point at which effluent is discharged to water when measured in the units specified in Column 2. For the purpose of this condition '90th percentile' means the value at which the relevant parameter is exceeded by no more than 10 percent of all sample results over the twelve month period.

Column 1	Column 2	Column 3	Column 4
Parameter	**Unit**	**90th percentile**	**Maximum**
Biochemical Oxygen Demand	mg/L		5
Total Suspended Solids	mg/L	8	10
Ammonia Nitrogen	mg/L		0.5
Total Nitrogen	mg/L	0.5	1
Total Phosphorus	mg/L	0.5	1
Free Chlorine	mg/L		0.1

E2 Stormwater Emission Limits

Stormwater discharged from Discharge Point 2 must not exceed the limits specified below

Parameter	Maximum (mg/L)
Total Suspended Solids	20
Biochemical Oxygen Demand	15
Total Petroleum Hydrocarbons	0.5
Oil and Grease	5

E3 Stormwater

1 Polluted stormwater that will be discharged from The Land must be collected and treated prior to discharge to the extent necessary to prevent serious or material environmental harm, or environmental nuisance.

2 Notwithstanding the above, all stormwater that is discharged from The Land must not carry pollutants such as sediment, oil and grease in quantities or concentrations that are likely to degrade the visual quality of any receiving waters outside the Land.

3 All reasonable measures must be implemented to ensure that solids entrained in stormwater are retained on The Land. Such measures may include appropriately sized and maintained sediment settling ponds or detention basins.

4 Stormwater discharged in accordance with this condition must not be directed to sewer without the approval of the operator of the sewerage system.

E4 Discharge Water Temperature

1 In the event that the temperature of wastewater discharged to Discharge Point 1 exceeds the investigation level, which is +/-7 degrees Celsius of the ambient water temperature in Donovans Bay, the Director must be notified within 24 hours. The notification must include, but not be limited to:

1.1 The duration and extent of the temperature exceedance; and

1.2 A timeline for providing:

1.2.1 an explanation as to why the investigation level was exceeded; and

1.2.2 strategies to limit the temperature to less than +/-7 degrees Celsius of the ambient water temperature in Donovans Bay, or demonstrate that the reported levels would not cause or threaten environmental harm.

<u>Hazardous Substances</u>

H1 Spill kits

Spill kits appropriate for the types and volumes of materials handled on The Land must be kept in appropriate locations to assist with the containment of spilt environmentally hazardous materials.

H2 Storage and handling of hazardous materials

Unless otherwise approved in writing by the Director, environmentally hazardous material held on The Land, including chemicals, fuels and oils, must be located within impervious bunded areas or spill trays which are designed to contain at least 110% of the total volume of material.

Monitoring

M1 Dealing with samples obtained for monitoring

1 Any sample or measurement required to be obtained under these conditions must be taken and processed in accordance with the following:

1.1 Australian Standards, NATA approved methods, the American Public Health Association Standard Methods for the Analysis of Water and Waste Water or other standard(s) approved in writing by the Director;

1.2 samples must be tested in a laboratory accredited by the National Association of Testing Authorities (NATA), or a laboratory approved in writing by the Director, for the specified test;

1.3 results of measurements and analysis of samples and details of methods employed in taking measurements and samples must be retained for at least three years after the date of collection; and

1.4 noise measurements must be undertaken in accordance with the Tasmanian Noise Measurement Procedures Manual.

M2 Location of Monitoring Points

For the purpose of this Notice the following sample location points are to be used (refer Attachment 2), unless otherwise approved in writing by the Director.

Monitoring Program	Sampling Location	Purpose	Northing	Easting
Tamar River	T1	The site at which wastewater would be discharged from an outfall pipe into the Tamar Estuary (if required)	5445674	491271
Tamar River	T2	Control / Reference site	5445065	491900
Donovans Bay	D1	Monitors quality of effluent being released from Discharge Point 1	5445700	491740
Donovans Bay	D2	Monitors water quality in Donavans Bay	5445696	491624
Donovans Bay	D3	Background site representative of a small bay	5444393	492744
Donovans Bay	D4	Background site representative of a small bay	5443846	491669
Effluent Quality	Discharge Point 1	Monitors quality of wastewater dischaged to Donovans Bay	5445700	491740
Stormwater Quality	Discharge Point 2	Monitors quality of stormwater discharged to Donovans Bay	5445832	491758

M3 Wastewater Monitoring

Samples of wastewater discharge must be collected by grab sampling at Discharge Point 1, and must be analysed for the parameters specified below at the sampling frequency specified, unless otherwise approved in writing by the Director.

Parameter	Unit	Frequency
Flow		Continuous
Temperature	Degrees C	Continuous
pH	unit	Daily
Dissolved Oxygen	%	Daily
Biological Oxygen Demand	mg/L	Monthly
Total Suspended Solids	mg/L	Monthly
Ammonia	mg/L	Monthly
Total Nitrogen	mg/L	Monthly
Total Phosphorus	mg/L	Monthly
Free Chlorine	mg/L	Monthly

M4 Tamar River Monitoring

The Water Quality And Biological Monitoring Program must be implemented following any commencement of discharge to the Tamar River through an outfall, unless otherwise approved in writing by the Director.

M5 Stormwater Monitoring

Samples of stormwater discharge must be collected by grab sampling at Discharge Point 2 and must be analysed for the parameters specified below using the sampling frequency specified, unless otherwise approved in writing by the Director.

Parameter	Unit	Frequency
Total Suspended Solids	mg/L	Quarterly
Biochemical Oxygen Demand	mg/L	Quarterly
Total Petroleum Hydrocarbons	mg/L	Quarterly
Oil and Grease	mg/L	Quarterly

M6 Donovans Bay Monitoring

Samples must be collected in accordance with the water quality and biological monitoring program at sample locations D1, D2, D3 and D4. Samples must be analysed for the parameters specified below using the sampling frequency specified, unless otherwise approved in writing by the Director.

Paramater	Unit	Frequency
Ammonia as N	mg/L	Quarterly
Nitrite + Nitrate as N	mg/L	Quarterly
TKN as N	mg/L	Quarterly
Total Phosphorus as P	mg/L	Quarterly
Chlorophyll a	mg/m^3	Quarterly
pH	unit	Quarterly
Dissolved Oxygen	mg/L	Quarterly
ORP	mV	Quarterly
Conductivity	uS	Quarterly
Turbidity	NTU	Quarterly
In-faunal assemblages		Biennially

M7 Eutrophication Monitoring

Samples must be collected and analysed in accordance with the Eutrophication Monitoring Program, unless otherwise approved in writing by the Director.

Noise Control

N1 Operation Noise Emission Limits

1 Noise emissions from the activity, except within Noise Limit Areas A and B (refer attachment 3), when measured at any noise sensitive premises and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:

1.1 45 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or

1.2 40 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or

1.3 35 dB(A) between the hours of 2200hrs and 0700hrs (Night time).

2 Noise emissions from the activity when measured at any noise sensitive premises within Noise Limit Area A and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:

2.1 45 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or

2.2 40 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or

2.3 38 dB(A) between the hours of 2200hrs and 0700hrs (Night time).

3 For the purpose of these conditions '**Noise Limit Area A**' is defined as the area bounded by the low water mark of the Tamar River and a straight line joining Point Rapid to Middle Point as indicated on the map in Attachment 3.

4 Noise emissions from the activity when measured at any noise sensitive premises within Noise Limit Area B and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:

4.1 50 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or

4.2 50 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or

4.3 50 dB(A) between the hours of 2200hrs and 0700hrs (Night time).

5 For the purpose of these conditions '**Noise Limit Area B**' is defined as PID 2954828, George Town Golf Course, as indicated on the map in Attachment 3.

6 If the combined level of noise from the activity and the normal ambient noise exceeds the noise levels specified above, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise level by at least 5 dB(A).

7 The time interval over which noise levels are averaged must be between 10 - 20 minutes.

8 Measured noise levels must be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the Tasmanian Noise Measurement Procedures Manual.

9 The noise limit or limits applicable at any specific noise sensitive premises can be varied by the Director provided that the occupiers and owners of the noise sensitive premise give their consent in writing to the variation and to any conditions attached to the variation.

N2 Comprehensive Site-Wide Noise Survey

1 Unless otherwise approved in writing by the Director, the comprehensive site-wide noise survey conducted in 2010 must be updated upon completion of the replacement, repair or addition of equipment that is a significant source of noise and where the equipment may increase or adversely alter the level and/or character of the noise emitted from the site. Equipment may be grouped to facilitate the measurement process. Where an item of equipment has more than one significant source of noise, each significant source of noise must be measured.

2 The survey must include:

2.1 The identification of all significant sources of noise on site;

2.2 Estimation of the spatial location, including elevation, of each item of equipment with respect to a well-established coordinate system; and

2.3 Sound pressure level measurements of each item of equipment to allow the determination of the one-octave band sound power levels being emitted.

3 The results from this survey must be used to predict the spatial distribution of A-weighted sound pressure levels, resulting only from the activities on site, to beyond a resultant level of 25 dB(A). This calculation must be based on a method, and meteorological conditions approved by the Director.

4 A report must be forwarded to the Director within six weeks of the completion of the survey detailing:

4.1 The positions of the identified items of equipment;

4.2 One-octave band sound power spectra of all identified sources;

4.3 Details of the prediction methodology; and

4.4 Contours of the predicted sound pressure levels equal to or above 25 dB(A).

N3 Record Of Noise Generating Activities

1 The person responsible must make and retain written or electronic records of the various operational activities and changes to operational activities, on the land, that have the potential to change the level and/or character of noise emitted from the site.

2 These records must include, but should not be limited to, the start of commissioning of major plant and equipment and any major start-ups and shutdowns of major plant and equipment.

3 These records must be provided to the Director within two weeks of any written request to do so.

N4 Noise Survey Requirements

1 Unless otherwise approved in writing by the Director, an annual noise monitoring survey must be carried out.

2 The survey must include, but is not necessarily limited to, the following:

2.1 A minimum of six measurement locations must be used, with one location established as a control location outside the likely influence of the proposed activity; and

2.2 Measurements must be made during day, evening and night times (as defined in these conditions) at each location to establish the acoustic environment, including any influence from the activity.

3 Measurements must include:

3.1 The equivalent continuous (Leq) and L_1, L_{10}, L_{50}, L_{90} and L_{99} A-weighted sound pressure levels measured over a period of between 10 and 20 minutes; and

3.2 One-third octave and narrow-band spectra (10 to 1000 Hz with 1 Hz resolution) over suitably representative periods of not less than 1 minute.

4 Detailed subjective descriptions of the sounds at each location and details of meteorological conditions relevant to the propagation of noise must be recorded at each measurement site.

N5 Noise Survey Report Requirements

1 A noise survey report must be forwarded to the Director within 60 days from the date the noise survey is carried out. The noise survey report must include the following:

1.1 The results of the measurements required by these conditions,

1.2 A map of the area surrounding the activity with the site boundary, measurement locations, and sensitive uses clearly marked on the map,

1.3 Any other information that will assist with interpreting the results and whether the activity is in compliance with these conditions and EMPCA, and

1.4 Recommendations of appropriate mitigation measures to manage any noise problems identified by the noise survey

Operations

OP1 Contact Person

1 The Director must be provided with written notification of telephone and/or pager contact details of a person who can respond to an incident relating to the activity, at any specified time, 24 hours a day.

2 The Director must be notified within 24 hours if:

2.1 The person who can respond to an incident relating to the activity ceases to be the person who can respond to an incident relating to the activity; or

2.2 There are changes to the telephone and/or pager contact details of the person who can respond to an incident relating to the activity.

OP2 Training and Competency

1 The operations manual must be kept in a location which is accessible by relevant operators at all times and must be made available to an authorised officer upon request.

2 Operators must be adequately trained so that they are competent to operate the activity such that it meets the requirements of this Notice and does not breach the EMPCA.

OP3 Emergency Response and Contingency Plan

The Emergency Response and Contingency Plan must be implemented unless otherwise approved in writing by the Director.

OP4 Fire Management Plan

1 A Fire Management Plan must be developed in accordance with the requirements of Tasmania Fire Service.

2 The activity must be undertaken in accordance with the plan which has been approved in writing by the Tasmania Fire Service. Any amendment to the plan must be approved in writing by the Tasmania Fire Service.

OP5 Plant and Equipment

1 All plant and equipment used in the activity must be:

1.1 maintained in accordance with the manufacturer's specifications;

1.2 operated in a proper and efficient manner in accordance with the manufacturer's specifications; and

1.3 operated by personnel holding technical qualifications or levels of competency consistent with any relevant standard defined by the Australian National Training Authority or otherwise approved in writing by the Director.

OP6 Flow Monitoring Equipment

1 Flow monitoring equipment must be installed to measure discharge from Discharge Point 1;

2 Equipment that is required to monitor flow must measure to +/-5% of true value;

3 Flow monitoring equipment must be calibrated in accordance with the manufacturer's specifications or at least once every 12 months; and

4 Calibration details must be recorded and kept for a minimum of 2 years.

OP7 Stormwater Management

1 Stormwater must be managed in accordance with the following measures:

1.1 Perimeter cut-off drains must be constructed at strategic locations on the land to prevent surface run-off from entering the area used or disturbed in carrying out the activity. All practicable measures must be implemented to retain sediment transported along these drains on the land, such measures may include provision of appropriately sized and maintained sediment settling ponds; and

1.2 Drains must have sufficient capacity to contain run-off that could reasonably be expected to arise during a 24 hour, 1 in 20 year rainfall event. Maintenance activities must be undertaken regularly to ensure that this capacity is maintained.

OP8 Design and Maintenance of Settling Ponds

1 Sediment settling ponds must be designed and maintained in accordance with the following requirements unless otherwise approved in writing by the Director:

1.1 ponds must be designed to successfully mitigate reasonably foreseeable sediment loss which would result from a 1 in 20 year storm event;

1.2 discharge from ponds must occur via a stable spillway that is not subject to erosion;

1.3 all dam walls must be stable and treated with topsoil and vegetated or otherwise treated in such a manner as to prevent erosion; and

1.4 ponds must be regularly cleaned out such that there is sufficient capacity to manage a 1 in 20 year storm event. Sediment removed during this cleaning must be securely deposited such that sediment will not be transported off the site by surface run-off.

Reporting

RP1 Annual Environmental Review

1 A publicly available Annual Environmental Review must be submitted to the Director annually by 30 April. The Review must include but not be limited to the following information:

1.1 A statement by the General Manager or Chief Executive Officer acknowledging the contents of the current Annual Environmental Review;

1.2 A listing of any complaints received from the public during the reporting period and any actions that have resulted;

1.3 A listing of environmental incidents and/or incidents of non compliance with permit or EPN conditions that occurred during the reporting period, and any mitigation or preventative actions that have resulted from such incidents;

1.4 A summary of any environment related procedural or process changes that have been implemented during the reporting period;

1.5 A summary of the monitoring data required by the Director. This information should be presented in graphical form where possible, including comparison with the results of at least the preceding reporting period. Special causes and system changes that have impacted on the parameters monitored must be noted. Explanation of significant deviations between actual results and any predictions made in previous reports must be provided;

1.6 A summary of fulfilment of environmental commitments made for the reporting period. This summary must include indication of results of the actions implemented and explanation of any failures to achieve such commitments;

1.7 A summary of the amounts (tonnes or litres) of both solid and liquid wastes produced and treatment methods implemented during the reporting period. Initiatives or programs planned to avoid, minimise, re-use, or recycle such wastes over the next reporting period should be detailed; and

1.8 A copy of the most recent version of the Emergency Response and Contingency Plan.

Schedule 3: Information

Legal Obligations

LO1 Notification of incidents under section 32 of EMPCA

1 A person responsible for an activity that is not a level 2 activity or a level 3 activity must notify the relevant Council, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as the result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause an environmental nuisance.

2 A person responsible for an activity that is a level 2 activity or a level 3 activity must notify the Director, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as a result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause an environmental nuisance.

3 A person responsible for an environmentally relevant activity must notify the Director, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as a result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause serious or material environmental harm.

4 The Director can be notified by telephoning 1800 005 171 (a 24-hour emergency telephone number).

5 Follow up reports can be emailed.

6 Any notification given by a person in compliance with this section is not admissible in evidence against the person in proceedings for an offence or for the imposition of a penalty (other than proceedings in respect of the making of a false or misleading statement).

7 A person is required to notify the relevant Council or the Director of an incident despite the fact that to do so might incriminate the person or make the person liable to a penalty.

8 Any notification referred to in subsection (1), (2) or (3) must include details of the incident, its nature, the circumstances in which it occurred and any action that has been taken to deal with it.

9 For the purposes of subsections (1), (2) and (3):

9.1 a person is not required to notify the relevant Council of an incident if the person has reasonable grounds for believing that the incident has already come to the notice of the Council

9.2 a person is not required to notify the Director of an incident if the person has reasonable grounds for believing that the incident has already come to the notice of the Director;

LO2 EMPCA

The activity must be conducted in accordance with the requirements of the *Environmental Management and Pollution Control Act 1994* and Regulations thereunder. The conditions of this document must not be construed as an exemption from any of those requirements.

LO3 Storage and handling of Dangerous Goods and Dangerous Substances

1 The storage, handling and transport of dangerous goods and dangerous substances must comply with the requirements of relevant State Acts and any regulations thereunder, including:

1.1 *Dangerous Goods (Road and Rail Transport) Act 2010*;

1.2 *Dangerous Goods (Road and Rail Transport) Regulations 2010;*

1.3 *Dangerous Substances (Safe Handling) Act 2005;*

1.4 *Dangerous Substances (Safe Handling) Regulations 2009;*

1.5 *Workplace Health and Safety Act 1995*; and

1.6 *Workplace Health and Safety Regulations 1998.*

LO4 Aboriginal relics requirements

1 The *Aboriginal Relics Act 1975*, provides legislative protection to Aboriginal heritage sites in Tasmania regardless of site type, condition, size or land tenure. Section 14(1) of the Act states that; Except as otherwise provided in this Act, no person shall, otherwise than in accordance with the terms of a permit granted by the Minister on the recommendation of the Director:

1.1 destroy, damage, deface, conceal or otherwise interfere with a relic;

1.2 make a copy or replica of a carving or engraving that is a relic by rubbing, tracing, casting or other means that involve direct contact with the carving or engraving;

1.3 remove a relic from the place where it is found or abandoned;

1.4 sell or offer or expose for sale, exchange, or otherwise dispose of a relic or any other object that so nearly resembles a relic as to be likely to deceive or be capable of being mistaken for a relic;

1.5 take a relic, or permit a relic to be taken, out of this State; or

1.6 cause an excavation to be made or any other work to be carried out on Crown land for the purpose of searching for a relic.

2 If a relic is suspected and/or identified during works then works must cease immediately and the Tasmanian Aboriginal Land and Sea Council and the Aboriginal Heritage Office be contacted for advice before work can continue. In the event that damage to an Aboriginal heritage site is unavoidable a permit under section 14 of the *Aboriginal Relics Act 1975* must be applied for. The Minister may refuse an application for a permit, where the characteristics of the relics are considered to warrant their preservation.

3 Anyone finding an Aboriginal relic is required under section 10 of the Act to report that finding as soon as practicable to the Director of National Parks and Wildlife or an authorized officer under the *Aboriginal Relics Act 1975*. It is sufficient to report the finding of a relic to Aboriginal Heritage Tasmania to fulfil the requirements of section 10 of the Act.

LO5 Change of responsibility

If the person who is or was responsible for the activity ceases to be responsible for the activity, they must notify the Director in accordance with Section 45 of the EMPCA.

Other Information

OI1 Waste management hierarchy

1 Wastes should be managed in accordance with the following hierarchy of waste management:

1.1 waste should be minimised, that is, the generation of waste must be reduced to the maximum extent that is reasonable and practicable, having regard to best practice environmental management;

1.2 waste should be re-used or recycled to the maximum extent that is practicable; and

1.3 waste that cannot be re-used or recycled must be disposed of at a waste depot site or treatment facility that has been approved in writing by the relevant planning authority or the Director to receive such waste, or otherwise in a manner approved in writing by the Director.

SCHEDULE 4
Further Particulars of the Grounds

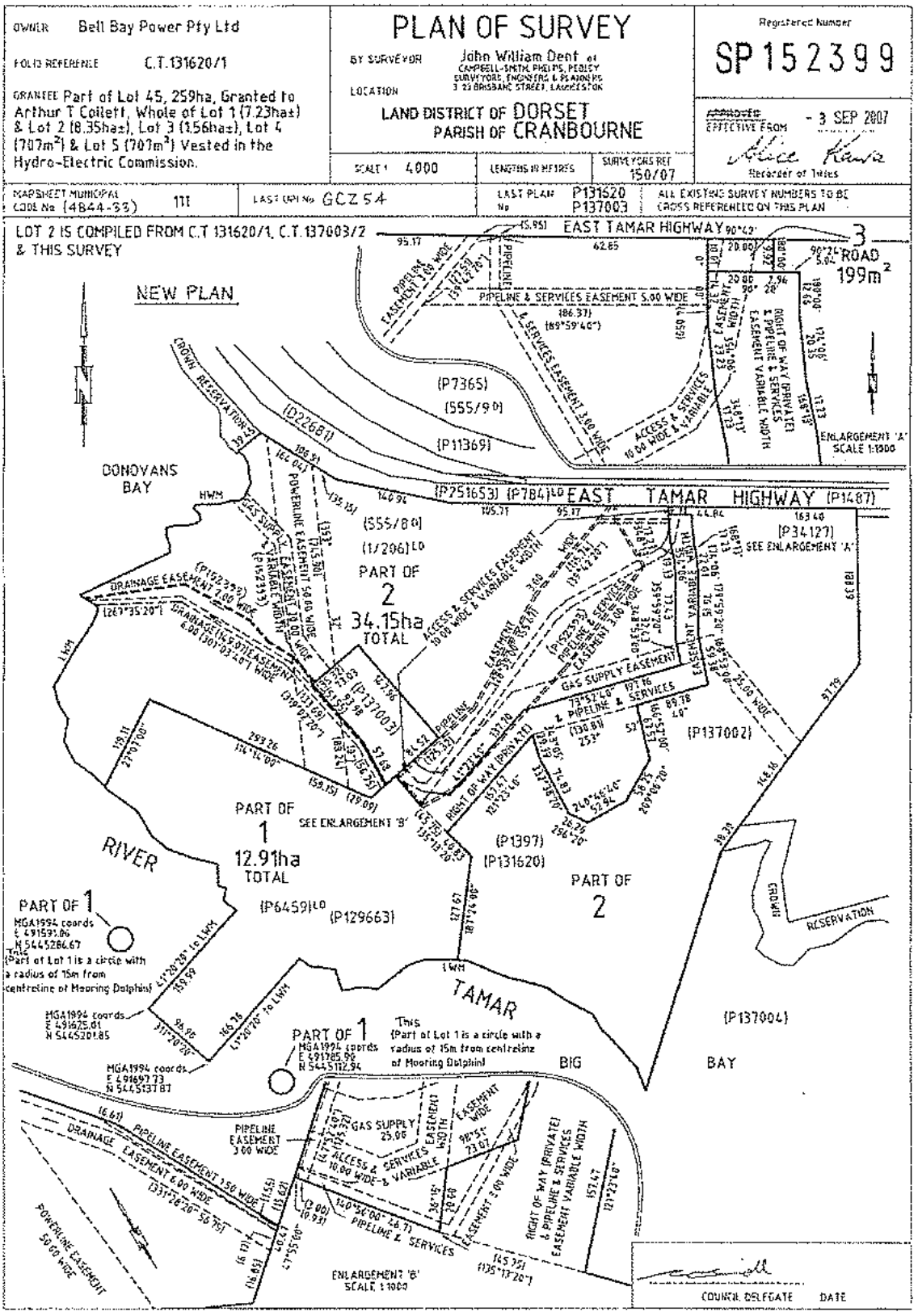
The following table provides further grounds for varying conditions of PCE No. 7467 as they relate to conditions in Schedule 2 of this Notice.

Condition Schedule 2	PCE No 7467	Grounds
Q1	Q1	Varied to reflect actual operations while maintaining the maximum allowable volume of wastewater discharged, per annum, from the activity.
G1	G1	Condition varied to clarify wording of condition and to reflect revised standard condition.
G2	G2	Condition varied to clarify wording of condition and to reflect revised standard condition.
G3	G3	No change.
G4	G4	Condition varied to clarify wording of condition and to reflect revised standard condition.
G5	G6	Condition varied to establish a responsibility for the implementation of the hazard identification and risk management program.
G6	G9	Condition varied to clarify wording of condition and to reflect revised standard condition.
A1	A1	No change.
A2	A2	Condition varied to clarify wording of condition and to reflect increase to NOx emission limit in line with the Environment Protection Policy (Air Quality) 2004.
A3	A3	Condition varied to reflect completion of commissioning and to establish the frequency for ongoing stack testing.
A4	A4	No change.
A5	A5	Condition varied to clarify wording of condition and to establish required detail of gas turbine operation register.
DC1	DC1	Condition varied to clarify wording of condition and to reflect revised standard condition.
DC2	DC2	Condition varied to clarify wording of condition and to reflect revised standard condition.
DC3	DC3	No change.
DC4	Nil	A new Condition to establish the responsibility for the timely notification of the temporary suspension of the activity and to prevent environmental harm occurring during that suspension to secure compliance with the general environmental duty
DS1	DS1	Condition varied to clarify wording of condition and to specify defined discharge point locations.
E1	E1	Condition varied to clarify wording of condition and to specify emission limits.

E2	E4	No change
E3	E5	Condition varied to clarify wording of condition and to reflect revised standard condition.
E4	Nil	A new condition reflecting the approved discharge water temperature investigation level and to establish a responsibility for the timely notification of any exceedance including duration and timeline for providing required additional information in order to ensure secure compliance with the general environmental duty.
H1	H1	Condition varied to clarify wording of condition and to reflect revised standard condition.
H2	H2	Condition varied to clarify wording of condition and to reflect revised standard condition.
M1	M1	Condition varied to clarify wording of condition and to reflect revised standard condition.
M2	M3	Condition varied to clarify wording of condition, to reflect completion of commissioning and to and to specify defined sample location points.
M3	M4	Condition varied to clarify wording of condition, to reflect completion of commissioning and to clarify the specified wastewater monitoring requirements.
M4	M5	Condition varied to establish the responsibility to undertake the Water Quality And Biological Monitoring Program prior to outfall discharge.
M5	M6	Condition varied to clarify wording of condition, to reflect completion of construction and to establish the responsibility for on-going stormwater discharge monitoring.
M6	M7	Condition varied to clarify wording of condition, to reflect completion of commissioning and to establish the responsibility for the on-going monitoring of Donovans Bay in accordance with the Water Quality And Biological Monitoring Program.
M7	Nil	New condition to establish the responsibility for eutrophication monitoring in accordance with the Eutrophication Monitoring Program to ensure compliance with the general environmental duty.
N1	N1	Condition varied to clarify wording of condition and to reflect additional Noise Limit Area.
N2	N2	Condition varied to clarify wording of condition, to reflect completion of commissioning and to establish the responsibility for the updating of the site noise survey.
N3	N3	No change.
N4	N4	Condition varied to clarify wording of condition, to reflect completion of commissioning and to establish the responsibility for the annual noise monitoring survey.
N5	N5	No change.

OP1	OP1	Condition varied to clarify wording of condition and to reflect completion of commissioning.
OP2	OP2	Condition varied to clarify wording of condition, to reflect completion of commissioning and to establish the responsibility to make the operations manual available upon request.
OP3	OP3	Condition varied to clarify wording of condition and to reflect completion of commissioning.
OP4	OP4	Condition varied to clarify wording of condition and to reflect completion of construction.
OP5	OP5	No change.
OP6	OP6	No change.
OP7	OP7	Condition varied to remove redundant clauses.
OP8	OP8	Condition varied to clarify wording.
RP1	RP1	Condition varied to clarify wording of condition and to establish the responsibility for the timely submission of an annual environmental review.
	G5, G7, G8, B1, B2, CN1, E2, E3, M2, M8, M9, WM1	Conditions no longer applicable.

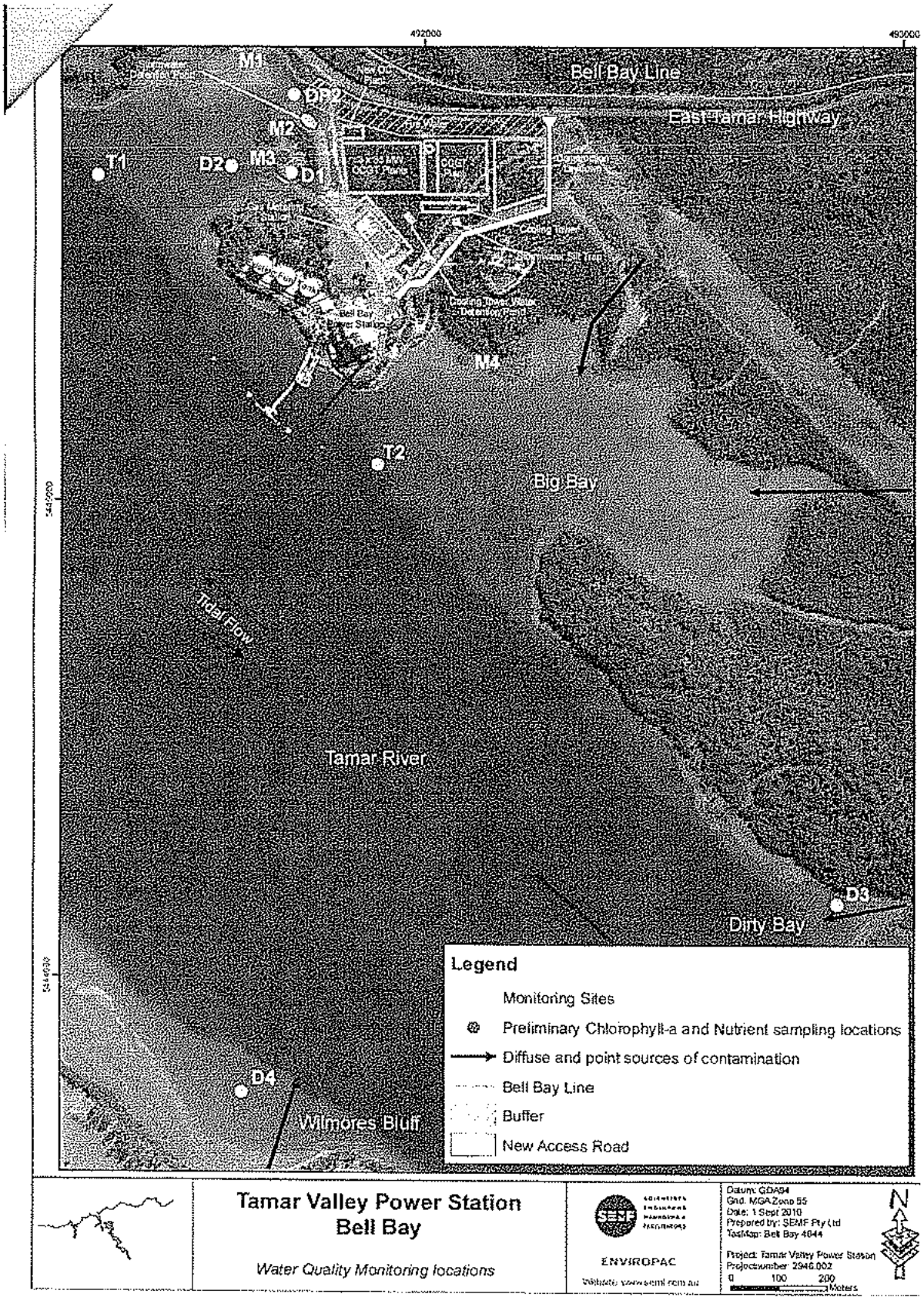
Attachment 1: The Land



DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Date of issue: 20 NOV 2012

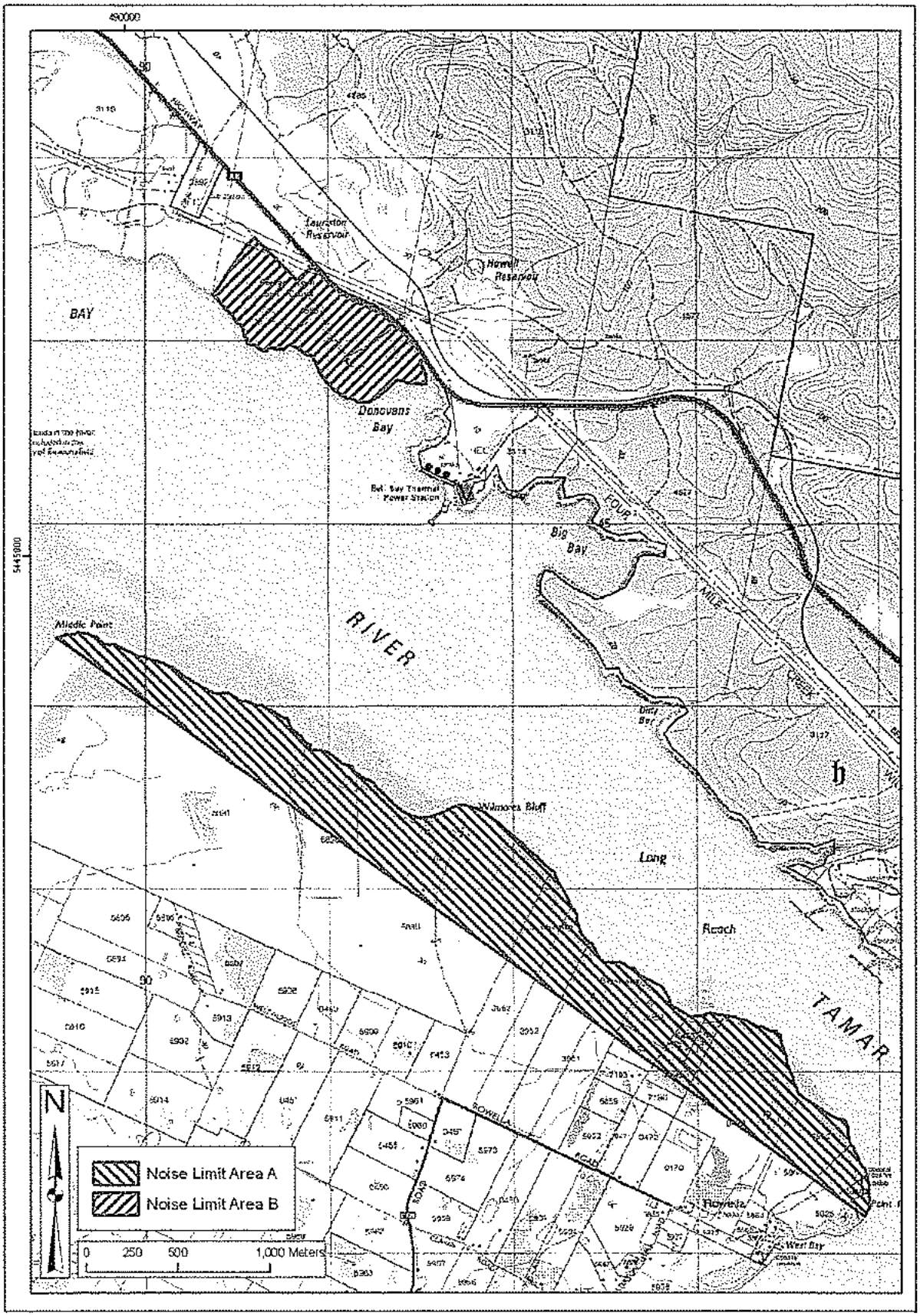
Attachment 2: Sample Location Points



DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Date of issue: 29 NOV 2012

Attachment 3: Noise Limit Areas A & B



DIRECTOR, ENVIRONMENT PROTECTION AUTHORITY

Date of issue: 20 NOV 2012

APPENDIX B

Emergency Response and Contingency Plan, Rev 1.9
(AETV Power Pty Ltd, January 2019)

Tamar Valley Power Station
EH&S Procedure
Emergency Response Plan

Proc-Site-A-EHS TVPS Emergency Response Plan

Emergency map located page 19

Facility address: **4055 East Tamar Highway**
GEORGE TOWN TAS 7253

Manifest Quantity Workplace

Emergency situation DIAL: **000**

Contact Numbers: 03 6380 2222 **or** 0439 885 039

Tamar Valley Power Station Central Control Room: 03 6380 2240

Hydro Tasmania – Generation control: 03 6230 5690 General
03 6230 5569 Alternative

0 Draft			SR		12/11/08
0.1		CWA			
0.2		Dr Dell			30/09/09
0.3		CWA			12/12/09
1.0				A Ciffo	22/07/10
1.1	WP Audit actions		CWA	A C	13/03/012
1.2	Contacts Updated			AC	1/08/12
1.3	General update	CS	KS,JF, CA	AC	14/08/13
1.4	General Update	CS		AC	29/07/14
1.5	General Update			AC	14/11/14
1.6	Update	CS	KS DQ TS TN	AC	31/05/16
1.7	Review	AB	DQ & TS	AC	8/06/17
1.8	Update include Entity Incident Management & associated documents	AC		AC	6/06/18
1.9	Review		TS		08/01/19
Rev	**Description**	**Originator**	**Reviewed**	**Approved**	**Date**

NOTE: Printed copies of this procedure may be out of date.
Refer to Q Pulse to verify the correct version is being used.

TABLE OF CONTENTS

1 Glossary and Abbreviations

Abbreviation / Term	Definition
AAC	Assembly Area Controller
AETV Pty Ltd	Fully owned subsidiary of Hydro Tasmania
Assembly Area	A designated and sign posted safe place where personnel assemble in the event of an emergency
CEO	Chief Executive Officer
FAC	Forward Area Controller
SDS	Safety Data Sheet
GM	General Manager
PSM	Power Station Manager
SEC	Site Emergency Co-ordinator
TVPS	Tamar Valley Power Station
CCR	Central Control Room
OMT	Operator Maintainer Technician
BBPS	Bell Bay Power Station
BBEP	Bell Bay Energy Precinct includes TNGP, TasNetworks & TVPS

2 Scope

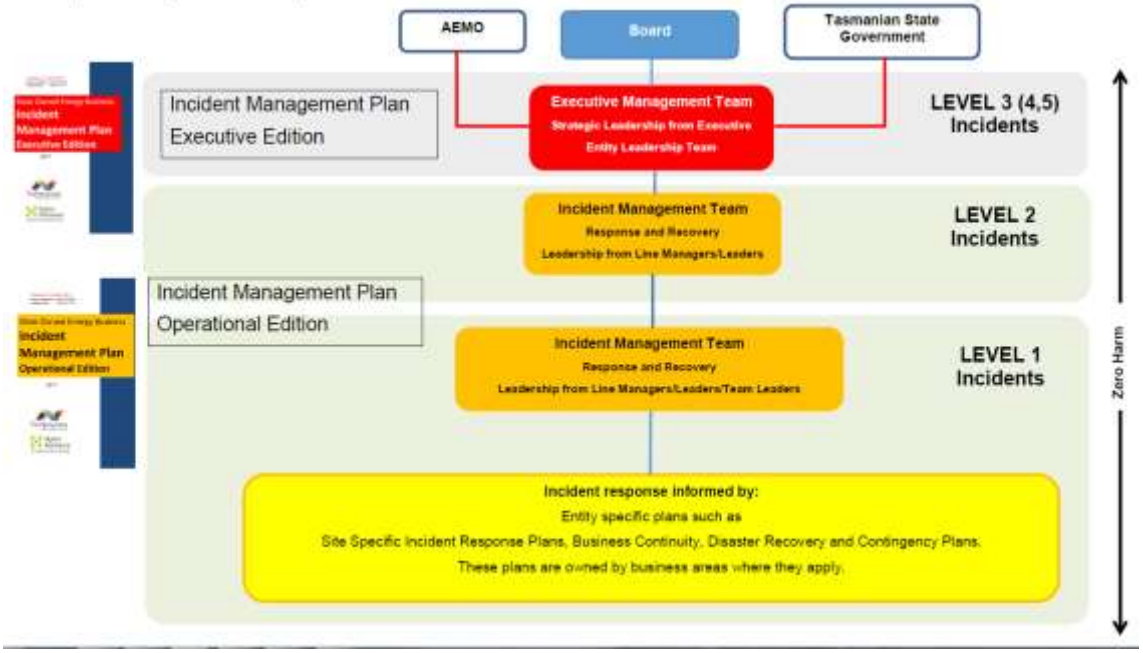
Hydro Tasmania and TasNetworks have an Incident Management Standard which defines activities for preventing and mitigating, managing and recovering from incidents in each entity. The Standard outlines the hierarchy of Incident Severity aligned with the Power System Emergency Management Plan (PSEMP) and the use of the Incident Management System (IMS). The Incident Management Plans are common across Hydro Tasmania and TasNetworks. Hydro Tasmania and TasNetworks will be referred to as the 'Entity'.

The Incident Management System is designed as a tool for use by staff managing incidents. It does not prescribe any actions to be taken in the management of an incident. The Incident Management Plans are intended for guidance on activities to be undertaken in the management of an incident.

This Document is a lower level site specific Emergency Plan applicable to the Tamar Valley Power Station and Bell Bay Power Stations. It is to be recognised that this is only a plan and not a prescriptive document. Each incident is a unique event; therefore, this plan is designed to provide guidance on responding to an emergency event.

The Entity Incident Management Framework (Fig 2 below) should be consulted in association with this plan.

Figure 2: Entity Incident Management Framework



This plan covers Site Incident Level 1 as per the Entity escalation flow.

3 Objectives

This plan is designed to manage emergencies and minimise the related hazards to employees, contractors, members of the public and the environment. Emergencies addressed by this plan may occur within the Tamar Valley Power Station (TVPS) and Bell Bay Power Stations (BBPS) **which are located within the Bell Bay Energy Precinct (BBEP**). Such emergencies may involve regional or State emergencies which threaten or impact any of the facilities in the BBEP.

The incident severity guide (Table 2 below) may initiate additional incident management levels within the organisation beyond the site boundary. For persons managing an immediate emergency onsite this as plan provides the local guidance which feeds information upwards into the higher levels of the Entity Incident Management Framework.

3.1 Priorities

AETV Power's priorities will be determined as follows:

- Is there any threat to human safety present?
- Is there any threat to the community or the environment?
- Is there any risk to production?
- Is there any risk to plant?

3.2 Emergency Management Locations

All emergency management for Tamar Valley Power Station & Bell Bay Power Stations occurs from the Tamar Valley Power Station Central Control Room.

4 Contact Numbers

The most up to date list of contact numbers is maintained in a separate document referred to as Tamar Valley Power Station Contacts Directory and Telephone listing. The following numbers are only reviewed annually and may be out of date. They have been included should a printed version of this document be the only reference available during an emergency.

4.1 Critical First Response

Position	Name	Contact Number
Emergency Services	Police, Fire, Ambulance	000
Gas Control (TNGP Pipeline Operator)	Emergency Contact Number (Pipeline Operations)	1800 195 666 (1300 557 505)
AEMO	Emergency Contact Number (alternate)	02 8884 5146 or (07 3347 3153)
Hydro Tasmania Control	Generation Control	03 6230 5569
TasNetworks Control	Transmission Control (HV) Distribution Control (LV)	(03) 6274 3704 (03) 6274 3711

4.2 Internal AETV Power

Position	Name	Contact Number
Production Manager	Chris Ashley	03 6382 2222 0439 885 031
Instrument Technician	Gene Wells	03 6380 2222 0439 885 038
Technical Manager	Tony Szabo	03 6380 2222 0439 898 459
COO (Chief Operations Officer)	Gerard Flack	03 6230 5905
Chairman (CEO Hydro Tas)	Stephen Davey	03 6230 5200
TVPS Central Control Room	Operator	03 6380 2240
Hydro Media Representative	Rowan Dix	0409 722 359

Position	Name	Contact Number
Managing Director TVPS & BSI	Craig Emmett	0429 427 597

4.3 External

Position	Contact Number
Tasports Bell Bay	03 6380 3111 03 6380 3175 AH
Environmental Systems and Contracting (Oil and chemical spill equipment)	03 6442 4892 0418 174 709
Veolia Environmental services	03 6332 6500
WorkSafe Tasmania	1300 366 322
Environmental Protection Authority (EPA)	1800 005 171
George Town Council	03 6382 8800

4.4 Secondary External Numbers

Please note the first response must be to the 000 Fire, Police, Ambulance number and these should be used as secondary external numbers, once the initial response has been raised.

Tasmanian Fire Service (Fire Comm)	03 6230 8420
Tasmanian Police – General	6230 2111 131 444
State Emergency Service	03 6336 3790
Director of Gas Safety (Andrew Ayton)	03 6477 7150 0438 381 712
Gas Specialist (WST) (Ralph Thomson)	(03) 6777 2848 0408 004 814
Palisade (gas pipeline owner)	03 95 22 3308
Worksafe Inspector	03 63 36 2236
District Operations	03 62 37 3115
TasNetworks Central Control Room	03 6274 3705

5 Raising the Alarm and Initial Response

5.1 Raising the Alarm

Raising the Alarm at Tamar Valley Power Station can be achieved manually by the following methods:

- **Dialling 333** on any site telephone will put you in contact with the Duty Operator in the Central Control Room. Communicate details of incident/emergency, location, persons injured, nature of emergency to the Duty OMT. After determining the nature of the Incident the Duty OMT can determine if an evacuation is required and activate the site wide emergency evacuation alarm. Subsequent **calls regarding the emergency should be via Central Control Room internal phone number 2240 or external 6380 2240.**
- Contact the Central Control Room **via mobile phone 0438 355 547 or 2- way radio**. **DO NOT USE A MOBILE PHONE IN THE AREA OF A SUSPECTED GAS LEAK OR IN A BATTERY ROOM.**
- Activating siren on **North wall of the Central Control Room.**
- **If at Bell Bay Power Station** Each work party must carry a station radio. Raise Central Control Room **on the radio** or phone **6380 2240.**

5.2 Initial Response by Persons at scene of initial Incident

- Raise the Alarm **by any of the above methods.**
- Make the area safe, if possible.
- Assist any injured persons and await further instructions from the Central Control Room or if unsafe, proceed to your nearest designated emergency evacuation assembly area. All subsequent contact with Central Control Room should be via Central Control Room **Operations Radio, internal phone number 2240 or external 6380 2240.**

5.3 Evacuation Procedure

- On hearing the alarm, immediately stop work and make the work area safe.
- Exit buildings/work area, using closest exits, looking for hazards.
- Personnel evacuating site must proceed to the nearest emergency evacuation assembly area and swipe access card at reader and await instruction from the Assembly Area Coordinator. Evacuation assembly area No 1 is situated on the Tamar Highway side of the administration building and Evacuation assembly area No 2 is on the North Road opposite the FT8 site entrance gates.
- Production personnel and Office Manager must proceed to the Central Control Room remaining in radio contact.
- All other site personnel (including AETV Plant Performance) must report to the nearest evacuation assembly area
- Emergency Evacuation assembly areas, the most senior person at each location should assume the role of Assembly Area Coordinator for that group and contact the Central Control Room using the fixed 2-way radio station located at each of the assembly areas or on 6380 2240 and advise of exact location and identity of persons assembled and await further instructions.
- Remain within listening distance of the 2 way radio as the radio network is the primary communications tool. Avoid using mobile phones as the system can become congested and / or tie up land line. Also only allows one on one conversation preventing rapid dissemination of information.
- Follow instructions given by the Assembly Area Coordinator

- If access to the nearest evacuation assembly area is impaired by a hazardous situation, i.e. gas leak or chemical spill, persons should assemble at the alternate evacuation assembly area. If the location of the chemical or gas leak is known observe the wind sock and move up wind, away from the Incident Site.
- If circumstances prevent persons physically assembling in either one of the two designated assembly areas, the most senior person at each location should assume the role of Assembly Area Coordinator (AAC) for that group. The AAC contacts the Central Control Room using the fixed 2-way radio if one present or on 6380 2240 and advise of exact location and identity of persons assembled and await further instructions.
- Remain within listening distance of the 2 way radio as the radio network is the primary communications tool.
- Follow instructions given by the Assembly Area Coordinator.

5.4 Communication Management

The most pressing issue early in the emergency is ensuring communication channels are open and managed. All persons involved are reminded that;

- 2-Way radios are the primary tool for communicating onsite during an emergency. Radios allow a wide range of people to be immediately made aware of the evolving situation.
- The use of mobile phones is secondary as many minutes may be lost finding and dialling then informing each individual in turn rather than multiple people.
- All communication with external parties needs to go through the Site Emergency Co-Ordinator (SEC). Individuals calling ambulances or fire services will just add confusion to both the emergency management on site and the emergency services trying to respond. They may not realise that the separate calls are related to the same incident.
- Only report facts and be aware that 2 way radios are open channels so avoid identifying casualties by name.

6 Alignment and integration with Stakeholders

This Plan describes AETV Power's arrangements for emergency response management at the Tamar Valley Power Station, the potential hazards associated with the power generation industry, the roles required to combat incidents, major emergencies and crises, emergency response and the processes to prevent or mitigate emergencies.

The plan is designed to work in conjunction with and to interface with various Emergency Plans of the other organisations operating in the Bell Bay Energy Precinct. This plan is also supported by Hydro's Emergency Reponses Plans, associated arrangements and resources. These plans include:

- State Owned Entity Incident Management Plan (Hydro & TasNetworks).
- Bell Bay Energy Precinct Communications Plan

The Owner's Emergency Response Plans will be implemented depending on the nature of the emergency event. Below provides guidance:

Site Incident (Local Incident) – Level 1 as per Guide in Table 2
Any unusual situation which is beyond normal business and processes to deal with effectively: • is outside usual operating conditions; • can cause, or has caused, harm to people (including the public), assets or the environment; • requires an immediate or timely response; • relates to a single site; and • **can** be controlled by local resources and site response plans.
Business Unit/Area Incident – Level 2 as per Guide in Table 2
Any unusual situation which is beyond the capacity of local management structures and processes to deal with effectively and impacts a number of sites or a business unit: • is outside of usual operating conditions; • can cause, or has caused, harm to people (including the public), assets or the environment; • requires an immediate and coordinated response across a number of sites or a business unit; and • **can** be controlled by internal response and recovery plans.
Entity Incident – Levels 3 as per Guide in Table 2
Any unusual situation which is beyond the capacity of normal management structures and processes to deal with effectively. It impacts a number of business units and requires management/support from the Executive: • is outside of usual operating conditions; • can cause, or has caused, arm to people (including the public), assets, the environment, or business reputation; • requires an immediate and coordinated response across the whole business; • **cannot** be controlled by local resources; and • requires the support of the Entity's Executive Management Team
System Incident – Level 4 as per Guide in Table 2
An incident with a market security/cross-jurisdictional impact. Incident coordinated by AEMO, The incident is managed by the entity as a Level 3 Incident.
System Incident – Level 5 as per Guide in Table 2
An incident impacting Tasmanian energy supply. The incident is managed by a direction from the Jurisdictional System Security Coordinator in consultation with the Responsible Officer. The incident is managed by the entity as a Level 3 Incident.

See Appendix 1 for the All Hazards Incident Rating Guide (referred to as Guide in table 2)

This site plan is activate for Level 1 & above;

Implemented onsite when:

- Outside normal safe operating conditions;
- Can cause harm to, or has caused harm to, people (including the public), environment or AETV Power assets, and business reputation;
- Requires immediate or timely response; and
- **There is any emergency onsite regardless of whether it can or cannot** be controlled by local resources.

This Plan is also consistent with and guided by:

- The *Australian Emergency Manual; and*
- *Tasmanian Emergency Management Plan* which documents the coordination arrangements for the management of major emergencies and disasters in Tasmania.

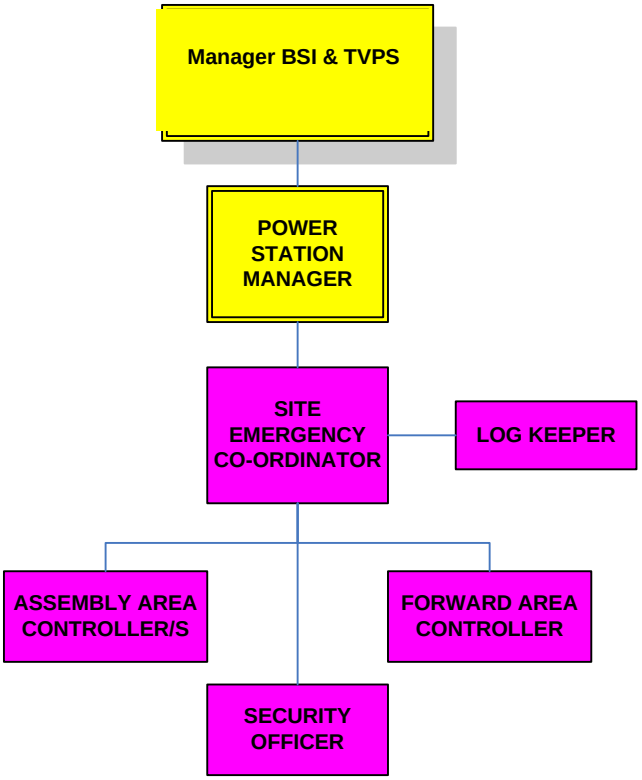
In addition, the Plan conforms to the emergency management requirements of the Tasmanian Electricity Industry Emergency Management Planning Guide, the Tasmanian Gas Supply Emergency Coordination Plan and the Tasmanian Office of the Economic Regulator.

6.1 Regulatory Authorities and Emergency Services

On matters relating to emergency response, AETV Power will:

- Maintain a high level of consultation with regulatory agencies.
- Maintain procedures for notifying the relevant regulators.
- Meet the requirements of various operating licences and Australian Standards.
- Maintain and review contact lists including contacts with the regulatory authorities and emergency services;
- Comply with, interface and coordinate AETV Powers emergency response requirements with the requirements of emergency services in control at an emergency site.

7 AETV Power Emergency Organisation



In the event on an emergency, initial response staffing will be provided by on-shift AETV Power personnel. This may well consist of only 1 person with initial back up from security, on call, available AETV staff as required and emergency services. The AETV emergency response is led by the **Site Emergency Co-ordinator (SEC)**.

This role will be initially the most senior operator on-shift in the Central Control Room. For more extreme emergency situations the Site Emergency Co-ordinator could interchange with an external emergency service, for example the Tasmanian Fire Service.

Due to the variances in on-shift personnel availability, this Emergency Response Plan must rely on support from State Emergency Services and agencies. These external expert teams provide the physical response to the emergency and implement the strategies and tactics as agreed by the Site Emergency Co-ordinator.

The **Forward Area Controller** (FAC) will be nominated by the Site Emergency Co-ordinator. This will be the person dispatched to the incident site. The FAC manages personnel, resources and information flow at the incident location.

The **Assembly Area Controller(s)** (AAC) is the most senior AETV Power employee present at the assembly. The AAC manages personnel, resources and information flow at the Emergency Assembly Area.

The **First Aid Team** is appointed under the direction of the SEC.

The **Log Keeper** will maintain a log of all key communications and provide support to the SEC as required.

Power Station Manager will ensure that all appropriate management actions are being taken during the emergency, the emergency is being handled appropriately in accordance with this Plan and the operating and unaffected plant remains effectively controlled.

Manager BSI & TVPS is responsible for keeping stakeholders including the CEO and third parties informed regarding the emergency, as appropriate and will initiate any escalation as per the Entity Incident Management System, severity guide as

Detailed response and guidance **Checklists** for the various incident scenarios and for each member of the Tamar Valley Power Station Emergency response Organisation are held in the Central Control Room.

8 Roles & Responsibilities

8.1 Prior to the Incident

Note – boxes □ can be used as tick sheet if necessary

The Power Station Manager is responsible for:

- ❑ Maintaining and updating these Emergency Procedures;
- ❑ Maintaining the personnel training plan;
- ❑ Maintaining the equipment and resources for incident combat;
- ❑ Periodic auditing and testing of these Emergency Procedures;
- ❑ Ensuring personnel are available, on a rostered basis, for any out of hours incident;
- ❑ Function testing and operational checks on all detection systems.

All Station personnel are responsible for:

- ❑ Completing visual inspections of plant as required by the station condition-monitoring schedule;
- ❑ Being available out of hours on a rostered basis in case of an incident;
- ❑ Maintaining a visual surveillance during working hours for potential incidents;
- ❑ Reporting any work or activity, which may compromise the effectiveness of protection systems to the duty operator, as it occurs.

- Familiarising themselves with this Plan and understanding their role and responsibilities in an emergency.
- Every person must register site attendance by utilising the swipe card facility.

The Duty Operator is responsible for:

- Ensuring awareness of the status of the station's protection system at all times.

All Personnel and Visitors responsible for:

- Reporting incidents and emergency situations immediately by contacting the Central Control Room.

8.2 During the Incident

All Production Personnel

- Report to the Central Control Room.

All Other persons including Plant Performance, Contractors & Visitors

- Report to Emergency Assembly Area (visitors must have received brief site induction and be under supervision of their sponsor

Office Manager

- Report to the Central Control Room.

Power Station Manager

- Ensures that appropriate emergency response actions are taking place.
- Ensures effective control of the operating or unaffected plant operations is taking place.
- May take over the function of Site Emergency Co-Ordinator (SEC) leaving the Duty Operator in control of the operating plant, or may designate another suitable person to act as SEC.
- Plan for rostering personnel to the various roles in the event of a protracted emergency.
- Keep the Chief Operating Officer (or delegate) informed and participate in the development of appropriate media statements if required.

Site Emergency Co-ordinator

- Wear the red safety vest and red helmet provided for recognition (located in the Central Control Room Emergency Response bin).
- Control the Emergency from the Central Control Room or if this is not possible, from the primary evacuation assembly area.
- Assess the incident/emergency and define emergency Alert Level in accordance with the Alert Levels given in Section 3.
- Appoint a Forward Area Controller to monitor the incident site.
- Appoint a Log Keeper and ensure a documented log of events and actions is maintained.
- Ensure First Aiders are assigned and first aid is administered for injured persons where possible.
- If manpower is available appoint a suitably trained resource as a Fire Systems Monitor to be located at the applicable fire suppression station, but only if safe to do so.
- Notify the Power Station Manager.
- Contact external emergency services.
- Communicate with Forward Area Controller/Assembly Area Controllers.
- Confirm action plan with the unassigned operators.
- Notify external agencies as per Statutory Incident Reporting Procedure.

Forward Area Controller

- Wear the red safety vest and red helmet provided for recognition (located in the Central Control Room Emergency Response bin);
- Liaise with Site Emergency Co-ordinator:
- Evaluate the extent of the emergency;
- Evaluate casualty numbers;
- Liaise with the emergency services;
- Isolate equipment where possible;
- Ensure safety of personnel at site.

Assembly Area Controller/s

- Wear the red safety vest and red helmet provided for recognition (stored in Central Control Room emergency bin)
- Ensure communication equipment is available and serviceable;
- Account for station personnel at the evacuation assembly area
- Maintain communication with Site Emergency Co-ordinator;
- Liaise with the Site Emergency Co-ordinator re personnel at Assembly Area;
- Record all movements in/out of station;
- Keep site secure;
- Ensure safety of personnel;
- Direct Emergency Services to emergency site.

Site Security Officer

- Print a copy of the evacuation list within 10 minutes of the start of the evacuation and thereafter as required by the Site Emergency Co-ordinator
- Maintain a log of personnel entering and leaving the site during the emergency
- Remain in communication with the Site Emergency Co-ordinator
- Direct the Emergency Services to the Central Control Room or to the site of the emergency if directed to do so by the Site Emergency Co-ordinator

All Non-Production personnel

- Take immediate action to raise alarm and evacuate station as necessary in accordance with the evacuation directions given by the Site Emergency Co-ordinator, taking care to avoid further danger/damage to personnel or equipment, eg. fire, acid, caustic, etc..
- Report to Assembly Area Controller and remain in communication with Central Control Room as far as practical. Assist with incident combat and clean up in cooperation with the Site Emergency Co-ordinator.

Log Keeper

- Ensure all incoming and outgoing calls are recorded noting who made or received call, summary of conversation and time.
- Record notable events, reports and instructions including times.
- Assist in manning telephone and communicating information to external parties.

The First Aid Personnel

- Liaise with Site Emergency Co-ordinator.
- Provide First Aid to casualties.

Fire Systems Monitor

- Stand by the applicable fire suppression system (pumps, CO2, Water Mist) in the event of a fire emergency if safe to do so.
- Confirm that the system is operational and remain so as required.

- Manually intervene to activate or restart as required.

All other personnel and visitors

- Evacuate to the designated Assembly Area as directed by the Site Emergency Co-ordinator. Swipe access card to acknowledge arrival at assembly area.
- Remain at the Assembly Area until the all clear is given or instructed to relocate by the Site Emergency Co-ordinator or the Assembly Area Controller. Swipe access card to depart assembly area after emergency is declared over.

8.2.1 After the Incident

Station Personnel will:

- Provide details for incident report;
- Participate in debrief.

The Power Station Manager will:

- Ensure all materials and resources used during the incident are replenished and/or paid for;
- Conduct debrief as soon as possible;
- Ensure all reports are complete;
- Manage the incident recovery and site rehabilitation
- Coordinate Station recommissioning.
- Ensure the Emergency Plan, Site Contact Lists and Check Lists remain current

9 Facility description

TVPS is located 40 minutes north of Launceston and 10 minutes south of George Town, in Northern Tasmania. Access to the facility is restricted and controlled by either security personnel or site personnel. The facility has a secure permitter fence with numerous vehicular access points.

The TVPS facility comprises:

- A base load Combined Cycle unit (203MW) - a Mitsubishi M701DA gas turbine and a SC1F-35.4 steam turbine
- A 58 MW Rolls Royce Trent 60 open cycle unit
- Three 40 MW, Pratt & Whitney FT8 Twin Pac Units – dual fuel
- Cooling tower
- Administration facility
- Security gate house
- First aid room
- Several chemical storage areas
- Two water treatment plants
- 2 workshops/storage areas
- Three switchyards
- Waste water retention pond
- Several laydown areas
- Sealed internal road network
- Water storage tanks for fire and process water
- Two bunded diesel tanks totally 500,000L capacity
- Gas reticulation network
- Water reticulation network

- Back-up generator supply

The emergency map shown in Section 10 of this Plan highlights some of the key features of the facility.

9.1 Dangerous Goods

Tamar Valley Power Station, due to the gas supply and large holding capacity of Diesel fuel, is classified as a **MQW - Manifest Quantity Workplace** under Work Health, Safety Act and Regulations 2012. The station was previously registered as Large Dangerous Substances under previous legislation – Dangerous Substances (Safe Handling) Act 2005.

9.1.1 Bulk Storage Tanks - Diesel

Two 250,000 Litre surface storage tanks exist to provide diesel to the dual fuel FT8 units and Rolls-Royce Trent 60. The tanks are fully bunded.

9.1.2 Other surface storage tanks

Various substances are stored across the site in up to 10,000 L containers (shown as chemical storage areas on the map in Section 10). All containers are clearly labelled and bunded.

9.1.3 Other

Minor quantities ranging from 1000L down to 205L or less of other Hazardous Substances and Dangerous Goods are located in the chemical storage areas shown on the map in section 10. These include hydrocarbons, substances used in the water treatment plant and various other substances used in day to day management of the facility. Flammable goods are kept in flammable goods cabinets. Storage of chemicals is in accordance with Safety Data Sheets, including maintaining minimum separation distances. A Chemical Manifest is available in hard copy and also available online.

10 Emergency map

Tamar Valley Power Station

Administration area

Controlled access Areas & Gates

Controlled access CO2 Deluge

Gas Control Zone

X Gate Vehicle x Gate Pedestrian

1 - Control Room, 2 - Workshop (mech), 3 – First aid room, 4 – Security, 5 – Chemical lab

AETVPower

11 Available Resources

Item	Location (see map)
Barriers Various (see list)	Workshop (mechanical)
Barrier Tape Red/White	Central Control Room Emergency Response bin
Confined Space Entry Fan	Workshop (mechanical)
Emergency Lighting/Compressors	Coates Hire (6326 6686)
First Aid Kit	Central Control Room
First Aid Kit	Chemical Laboratory
First Aid Kit	Workshop (mechanical)
First Aid Kit, Stretchers, Oxygen and other general equipment	First Aid Room
Defibrillator	Central Control Room
Defibrillator	ACH101 switching PPE cabinet
Defibrillator	Central Control Package switching PPE cabinet
Defibrillator (Portable)	Permit Office
Full Body Harness (s)	Workshop (mechanical)
Hand Tools	Workshop (mechanical)
Low Voltage Electrical Rescue Kit	ACH 101, 102, 103, 104 MCC
Low Voltage Electrical Rescue Kit	CCR, 201 MCC , Battery rooms, CCP
Low Voltage Electrical Rescue Kit	WTP, CW, MCC
Low Voltage Electrical Rescue Kit	Central Control Room
Minor Oil Spill Kit	Unit 101
Minor Oil Spill Kit	Unit 102
Minor Oil Spill Kit	Unit 103
Minor Oil Spill Kit	Workshop (mechanical)
Chemical Spill Kit	Water Treatment Plant
Chemical Spill Kit	Workshop (mechanical)
Liquasweep Absorbent (Chemicals, Oils, Paints etc)	Shipping Container WTP, FT8 Oil Store, Main Warehouse
Portable Lighting	Workshop (mechanical)
Portable Pumps	Coates Hire/Workshop
Safety Signs (portable) (see list)	Workshop (mechanical)
Suction Truck	Veolia 03 6332 6500
Oil Recovery	Hagen Oil 63 344664
SF6 Spill Kit	Workshop (Electrical)
Various Automatic Deluge Systems	All GT Enclosures
Fire Hoses	Various Locations
Hydrants	Various Locations

12 Statutory Notification Procedure

See Statutory Reporting Requirements Procedure. Except below

A written log, including the time, date and persons contacted, for any communications made with the required Statutory Authorities listed in the above procedure must be made. This is the responsibility of the Power Station Manager, or in the Power Station Manager's absence, or delegate or Duty OMT.

13 Guidelines for Dealing with the Media and Community Enquiries

Statements to the media, members of the public and other third parties are the responsibility of the CEO (or delegate), in conjunction with the Power Station Manager.

Due to the nature of power station and pipeline emergencies, employees may be approached for information by reporters preparing stories about the event.

Employees should avoid making any comments to the media or reporters and refer all such requests to the Power Station Manager

AETV Power response to media inquiries should be guided by the following principles:

In the event that an emergency situation arises that generates media inquiries, the primary responsibility for communicating information, both internally and externally, resides with CEO (or delegate), in cooperation with Power Station Manager through the media liaison provided by Hydro's Brand & Communication sections.

At the scene of an emergency or otherwise, media or community inquiries should be directed to the Power Station Manager

The CEO may appoint a media-trained member of staff to respond where on-camera, on-site interviews are required. Agreed messages will be developed to guide the appointed member of staff. In some instances, it may take the approved manager or trained spokesperson some time to reach the incident site. In this case, the Power Station Manager may provide agreed information to media.

All radio and print enquiries should be handled by the Power Station Manager.

Reporters generally are not familiar with power station operations or the safety precautions to be taken at AETV Power but they are skilled at gathering information from a variety of sources. Competition among news media is strong, and that competition often leads the media [especially "live" media such as radio and television] to attempt to be first with a developing news story such as an incident.

The Power Station Manager may have to manage the media at the site.

14 Declaration regarding end of Incident

The SEC, in consultation with PSM (and emergency services), will determine and declare when the emergency has ceased. This decision will be based on a risk review of the current situation.

Post incident actions will be developed to ensure the recovery phase is initiated and that any equipment is returned to service in a safe manner.

For clean-up and disposal, see Proc-Site-A-EHS TVPS Waste Management Procedure

15 Debrief

At the first opportunity all involved personnel should participate in a debriefing session chaired by the Power Station Manager and focuses on capturing as much information as practicable about the emergency event or situation from as many participants as possible. This will assist in the following:

The cause;

Prevention of a similar or repeat incident;

Evaluation of procedures, plans and guidelines.

The incident must be investigated and fully documented in accordance with AETV Power's Incident Investigation Procedure.

16 Emergency Drills and Exercises

16.1 Weekly Alarm Testing

The audible alarm will be tested at least once a week. This test will be conducted at 8:00 hrs each Monday morning excluding public holidays. Power Station Manager is responsible for ensuring the alarm is sounded so as to familiarise all personnel with the emergency alarms. The evacuation procedure shall be tested at least every three months at the discretion of the Power Station Manager, in co-ordination with the Production Manager to ensure that all personnel are familiar with the evacuation procedure.

Any person failing to respond to an evacuation alarm during testing will be in breach of company procedures and appropriate disciplinary action will apply.

16.2 Emergency Exercises

Emergency Evacuation shall be conducted twice yearly.

Emergency exercises will be conducted annually, alternating between a full field exercise in one year and a desktop exercise the next.

The emergency exercises shall be planned to simulate different credible scenarios so as to maximise the level of emergency training. The occurrence of one or more real site emergencies during the year and the accompanying debrief may be deemed adequate to replace the fully mobilised exercise, depending on the extent of the event. Any such substitution will be agreed between the EH&S Committee and Power Station Manager.

Exercises will endeavour to keep up familiarity with use of Fire Fighting Equipment and First Aid kits etc.

External emergency services or agencies and other Precinct organisations may be included in the two-yearly field exercise with prior arrangement only.

Emergency exercises shall be documented in a report describing the scenario, the response, observers' comments, log of events, along with lessons learnt, and actions arising. A list of all rostered personnel shall be included in the emergency exercise report as emergency training records.

17 Review

This Plan is reviewed annually, at a minimum, but may be reviewed at any time. The last approved Plan will be followed.

18 Associated Documents

Entity Incident Management System Documents;

These documents are available in Qpulse or Online at https://ecm0.hydrotasmania.com.au/otcs/cs.exe?func=ll&objId=5520412&objAction=browse&viewType=1

- Incident Management System:- Reference Guide
- Incident Management Plan :- Operational Edition
- Incident Management System Plan:- Executive Edition
- Incident Management:- Contact Details
- Hydro Tasmania- Assets and Infrastructure:- Emergency Quick response Flip Chart.
- Incident Management System:- Templates, Forms, Guides, Checklists.

Internal TVPS documents

- IMS-SI-A-EHS Emergency Management Imperatives
- Bell Bay Energy Precinct Emergency Management Communication Plan (EMCP)
- Check sheet Site Emergency Response Wall Mounted
- Proc-Site-A-EHS Response to Emergency Scenarios
- WI-Site-P-EHS TVPS Natural Gas Emergency Isolation
- WI-OCGT-P-EHS OCGT Emergency Power Isolation
- Proc_EHS_E_Gate Emergency Release
- Proc-Site-A-EHS Statutory Reporting of Incidents
- TPL-Site-A-EHS TVPS Incident Reporting & Investigation Form
- WI-SITE-P-EHS Shutdown During Bush Fire
- Dangerous Substances location plans for TVPS
- WI-201-P-EHS Turbine Oil System Fire Guide
- TVPS Fire Management Plan

- Diesel Fire Prevention and Control
- Site Fire Ring Main FM Global Drawing
- Proc-Site-A-EHS Chemical Management
- Proc-Site-A-EHS Oil Management
- Proc-Site-A-EHS First Aid
- Proc-Site-A-EHS Access Protocol and Security

Appendix 1 Incident Severity Guide

Table 2: Incident Severity Guide

ALL HAZARDS Incident Rating Guide										
Incident Lead			Lead Agency	LEVEL	PSEMP	PEOPLE	ENVIRONMENT	ASSET	REPUTATION	LEGAL
Local Incident Management Team (Site)	Unit/Area Incident Management Team (Business Unit/Area/Multiple Sites)	Entity Executive Management Team	JSSC, Impacted Entity Executives and AEMO	5	Jurisdiction intervenes in normal market operations in response to the power system emergency					
			AEMO and Impacted Entity Executives	4	Overall system integrity is being impacted and requires a coordinated response					
			Entity Executive	3	**Entity Incident** Widespread incident affecting a single industry participant requiring strategic direction by Entity executive	Fatality/ injury causing loss of quality of life /long term disability /impact on health /threat to public safety	Extreme environmental harm; local species destruction; widespread chronic contamination with doubtful recovery; extensive clean up required	Actual or potential for serious internal business continuity and commercial impact or power supply is significantly disrupted	Persistent, negative public exposure– dramatic undermining of stakeholder confidence. Extensive media attention	Considerable penalties & prosecutions. Multiple law suits & potential jail terms
			Entity Business Unit/Area Manager or Leader	2	**Area Incident** Significant and noticeably affects the participant's ability to deliver service and impacts on the community	Medical Emergency/ restricted work duty injury /Confirmed missing person /single lost time injury/ Reversible impact on health	Moderate environmental impact; cleaned up; restricted to the area of the asset	Potential commercial impacts to local businesses and NEM participants	Systemic incidents – some limited media attention	Serious breach of law; report to authority, prosecution and/or moderate penalty
			Entity Site Manager or Leader	1	**Site (Local) incident** can be dealt with by local resources, local site or control room supervisor normally manages this incident	Injury – site treatment and review. Suspected missing person	Low environmental impact; rapid clean up; restricted to areas already impacted by the operation	Commercial impact limited to repair and restoration costs (no significant unbudgeted expenditure)	Slight impact/isolated impact – negligible or no media attention	Minor non-compliance and breaches required to be reported

APPENDIX C1

Analysis results for current WWRP sludge samples from within the WWRP and Bell Bay stockpile
(Samples collected on 13 and 14 August 2019 respectively)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1913546**	Page	:
Client	: **AURORA ENERGY TAMAR VALLEY PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS KATHY SHANLEY	Contact	: Customer Services EM
Address	: 4055 EAST TAMAR HIGHWAY P.O.BOX 400 GEORGE TOWN TASMANIA 7235	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6380 2224	Telephone	: +61-3-8549 9600
Project	: MONTHLY SAMPLING	Date Samples Received	: 19-Aug-2019 12:55
Order number	: 4410043025	Date Analysis Commenced	: 22-Aug-2019
C-O-C number	: ----	Issue Date	: 27-Aug-2019 15:19
Sampler	: KATHY SHANLEY		
Site	:		
Quote number	: ME/717/11		
No. of samples received	:		
No. of samples analysed	:		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG005T & EG035T: Metal LORs for EM1913546 #1 - #4 has been raised due to sample matrix.
- EP231X: LOR's raised for particular compounds due to sample matrix interferences.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	WWRP - NW	WWRP - NE	WWRP - SE	WWRP - SW	BB -15
			Client sampling date / time	13-Aug-2019 14:00	13-Aug-2019 14:00	13-Aug-2019 14:00	13-Aug-2019 14:00	14-Aug-2019 14:00
Compound	CAS Number	LOR	Unit	EM1913546-001	EM1913546-002	EM1913546-003	EM1913546-004	EM1913546-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	98.0	96.7	97.0	98.4	19.8
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	55	37	26	83	40
Chromium	7440-47-3	2	mg/kg	24	27	<23	28	25
Copper	7440-50-8	5	mg/kg	71	54	50	87	34
Manganese	7439-96-5	5	mg/kg	2890	3190	1020	2430	1260
Molybdenum	7439-98-7	2	mg/kg	81	59	39	243	30
Nickel	7440-02-0	2	mg/kg	28	31	<23	34	24
Zinc	7440-66-6	5	mg/kg	1720	766	465	1740	355
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<1.0	<1.1	<1.1	<1.1	0.2
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	7.4	7.3	7.5	7.5	6.9
After HCl pH	----	0.1	pH Unit	1.2	1.6	1.6	1.2	1.2
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	4.9	5.0	5.0	4.9	5.0

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BB -18	----	----	----	----
			Client sampling date / time	14-Aug-2019 14:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1913546-006	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**34.9**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**61**	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**29**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**50**	----	----	----	----
Manganese	7439-96-5	5	mg/kg	**1500**	----	----	----	----
Molybdenum	7439-98-7	2	mg/kg	**37**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**31**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**621**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	**0.2**	----	----	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	**6.8**	----	----	----	----
After HCl pH	----	0.1	pH Unit	**1.3**	----	----	----	----
Extraction Fluid Number	----	1	-	**1**	----	----	----	----
Final pH	----	0.1	pH Unit	**5.1**	----	----	----	----

Analytical Results

Sub-Matrix: **TCLP LEACHATE** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	WWRP - NW	WWRP - NE	WWRP - SE	WWRP - SW	BB -15
				Client sampling date / time	13-Aug-2019 14:00	13-Aug-2019 14:00	13-Aug-2019 14:00	13-Aug-2019 14:00	14-Aug-2019 14:00
					EM1913546-001	EM1913546-002	EM1913546-003	EM1913546-004	EM1913546-005
					Result	Result	Result	Result	Result
EG005(ED093)C: Leachable Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Manganese	7439-96-5	0.1	mg/L		**1.8**	**3.7**	**1.1**	**1.4**	**4.0**
Zinc	7440-66-6	0.1	mg/L		**0.3**	**0.6**	**0.2**	**0.3**	**0.3**
Molybdenum	7439-98-7	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: **TCLP LEACHATE** (Matrix: **WATER**)				Client sample ID	**BB -18**	**----**	**----**	**----**	**----**
				Client sampling date / time	14-Aug-2019 14:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EM1913546-006**	**--------**	**--------**	**--------**	**--------**
					Result	----	----	----	----
EG005(ED093)C: Leachable Metals by ICPAES									
Arsenic	7440-38-2	0.1	mg/L		<0.1	**----**	**----**	**----**	**----**
Manganese	7439-96-5	0.1	mg/L		**1.5**	**----**	**----**	**----**	**----**
Zinc	7440-66-6	0.1	mg/L		**0.6**	**----**	**----**	**----**	**----**
Molybdenum	7439-98-7	0.1	mg/L		<0.1	**----**	**----**	**----**	**----**

APPENDIX C2

Environmental Approval No. 9712/1 Treatment and reuse of contaminated gravel
(EPA correspondence dated 1 July 2019)

Level 2, Henty House, 1 Civic Square, Launceston TAS 7250
GPO Box 1550, Hobart, TAS 7001 Australia

Enquiries: Steve Windsor
Ph: +61 3 6777 2075
Email: Steve.Windsor@epa.tas.gov.au
Web: www.epa.tas.gov.au
Our Ref: EN-EM-IC-249553 | M493856

ENVIRONMENT PROTECTION AUTHORITY

1 July 2019

Mr Stephen Davy
Chief Executive Officer
Hydro Tasmania
4 Elizabeth Street
HOBART TAS 7000

Attention: Adam D'Andrea

Dear Mr Davy

ENVIRONMENTAL APPROVAL NO. 9712/1
TREATMENT AND REUSE OF CONTAMINATED GRAVEL

On 15 May 2019, the EPA received Analytical Services Tasmania (AST) Laboratory Report No. 91865 from Mr Adam D'Andrea detailing polychlorinated biphenyl and total petroleum hydrocarbon results for two samples of gravel taken at the Bell Bay Power Station on 11 April 2019. The material so sampled was from approximately 50 cubic metres of gravel that became contaminated on 14 May 2016 when about 200L of diesel spilled onto a compacted gravel hardstand. Contamination varying from level 3 to level 4 as per *Information Bulletin No. 105 Classification and Management of Contaminated Soil for Disposal, November 2012 (IB105)* was found.

Subsequently, Environmental Approval No. 9712/1 was issued to Hydro Tasmania in July 2017 under Regulation 12 of the *Environmental Management and Pollution Control (Waste Management) Regulations 2010*. The EA provided for treatment, and reuse of the material as hardstand, if effectively treated.

The AST Laboratory Report shows that PCB and all petroleum hydrocarbons in the samples are below the limit of reporting, meaning that hydrocarbon contamination has been reduced sufficiently to classify the material as fill material in accordance with *IB105*.

Ms Kathy Shanley (AETV) hosted a site visit by EPA officer Steve Windsor on 19 June 2019 during which it was confirmed that the contaminated gravel had been stored within a fully bunded area, as in the document *Bell Bay Power Station EMP Diesel Storage May 2017,* and appropriately sampled.

Accordingly, all the relevant requirements of EA No. 9712/1 have been fulfilled and the material can now be re-used on the Bell Bay site if required.

Please note that fill material still needs to be handled in a manner to prevent environmental harm.

If you have any queries, please contact Steve Windsor per the details at the head of this correspondence.

Yours sincerely

Cindy Ong
MANAGER, ENVIRONMENTAL OPERATIONS NORTH
Delegate for the Director, Environment Protection Authority

cc Adam D'Andrea, Environmental Scientist, Hydro Tasmania, Adam.D'Andrea@hydro.com.au
Kathy Shanley, Chemical Technician, AETV Power Pty Ltd, Kathy.Shanley@hydro.com.au

APPENDIX D

EPA correspondence titled: Postponement of monitoring requirements
Environment Protection Authority
(19 May 2020)

Environment Protection Authority

GPO Box 1550 HOBART TAS 7001 Australia

Enquiries: Steve Windsor
Phone: +61 3 6777 2075
Email: Steve.Windsor@epa.tas.gov.au
Web: www.epa.tas.gov.au
Our Ref: EN-EM-PE-FU-110315_3 |M651205

19 May 2020

Mr Tony Szabo
Tamar Valley Power Station Manager
Aurora Energy (Tamar Valley) Pty Ltd
4055 East Tamar Highway
GEORGE TOWN TAS 7253

Email: Tony.Szabo@hydro.com.au

Dear Mr Szabo

POSTPONEMENT OF MONITORING REQUIREMENTS

I refer to email correspondence received from Tamar Valley Power Station (TVPS) by Ms Kathy Shanley on 8 April 2020 requesting a 12 month exemption from monitoring and reporting against Conditions A3, M6 and N4 of Permit No. DA 2007/072 as varied by Environment Protection Notice (EPN) No. 7898/1 (the Permit) due to be completed in 2020. A previous extension for Condition A3 was granted on 18 March 2020 and does not need reiterating here.

I understand that due to current COVID-19 restrictions, including social distancing measures and travel restrictions affecting interstate monitoring contractors, TVPS cannot fulfil monitoring and reporting requirements against Condition M6 at Donovans Bay. I note that due to the Combined Cycle Gas Turbine (CCGT) not operating over the past 12 months, rates of wastewater discharge to Donovans Bay have been low. Furthermore, I understand low discharge rates are expected to continue given TVPS do not intend to operate the CCGT for the foreseeable future.

I also understand that given the CCGT will not be operational, combined with a low operational need for the Open Cycle Gas Turbines (OCGTs) the requirement for noise monitoring and reporting consistent with Conditions N4 and N5 is also reduced. However, I acknowledge that TVPS have continuous onsite noise monitoring that can be accessed remotely.

Therefore, pursuant to Condition M6, N4 and N5 of the Permit, I approve a 12-month exemption for monitoring and reporting with the following updated due dates:

- Donovans Bay quarterly monitoring parameters to be completed by 31 March 2021,
- Donovans Bay in-faunal assemblages monitoring parameter to be completed by 30 September 2021,
- Noise Survey to be conducted by 31 March 2021, and
- Noise Survey Report to be submitted by 31 May 2021.

Should circumstances change or if you have any queries about this matter, please contact Steve Windsor on the contact details at the head of this correspondence.

Yours sincerely

Glen Napthali
ACTING MANAGER, ENVIRONMENTAL OPERATIONS NORTH
Delegate for the Director, Environment Protection Authority

cc: Kathy Shanley, Chemical Technician, TVPS, Kathy.Shanley@hydro.com.au
Chris Ashley, Operations Manager, TVPS, Chris.Ashley@hydro.com.au
Catherine Ford, Principle Environmental Scientist, COVA, Catherine.Ford@covathinking.com

APPENDIX E1

Stack emission results summary and for individual unit (2019 to 2020)

Stack testing results NO_x (as NO_2 @ 15 % O_2)

(AER reporting Period 1 April 2019 to 31 March 2020)

UNIT	TURBINE	EPN LIMIT	29-Apr-19	27-Jun-19 & 8-Jul-19	5/08/2019*	17-Dec-19	1-Mar-20
Unit 101A	Pratt & Whitney OCGT	70	No Test	No Test	67	57	#
Unit 101B	Pratt & Whitney OCGT	70	No Test	No Test	69	55	#
Unit 102A	Pratt & Whitney OCGT	70	No Test	69	No Test	62	#
Unit 102B	Pratt & Whitney OCGT	70	No Test	68	No Test	66	#
Unit 103A	Pratt & Whitney OCGT	70	No Test	59	No Test	59	#
Unit 103B	Pratt & Whitney OCGT	70	Permanently offline				
Unit 104	Rolls Royce Trent OCGT	60	54	44	No Test	37	#
Unit 201	Mitsubishi CCGT	60	55	Offline	Offline	Offline	Offline #

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Unit 101A Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant				Ektimo	Ektimo	
Unit		101A	101A	101A	101A	101A
Date		29-Apr-19	8-Jun-19	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		No Test	No Test	12:22	9:50	#
End Time				13:21	10:49	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	°C			443	469	#
Gas Velocity	m s^{-1}			46	50	#
Moisture content	%			7.2	6.5	#
O_2	%			15.5	15.4	#
CO_2	%			3.0	2.9	#
Dry standard flow rate	dscm/min			6,700	7,100	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	70	70	70	70	70
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3			67	57	#
NO_X (as NO_2)	mg/m^3			62	54	#
NO_X (as NO_2) Emission Rate	g/min			420	380	#
CO (Corrected)	mg/dscm			21	18	#
CO	mg/m^3			19	17	#
CO Emission Rate	g/min			130	120	#
CO Emission Rate	g/sec			2.2	2.0	#
NO_X (as NO_2) Emission Rate	g/sec			7.0	6.3	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 101B Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant				Ektimo	Ektimo	
Unit		101B	101B	101B	101B	101B
Date		29-Apr-19	8-Jun-19	5-Aug-19	17-Dec-19	1-Mar-20
Start Time		No Test	No Test	13:16	9:56	#
End Time				14:16	10:56	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	^{o}C			452	447	#
Gas Velocity	$m\ s^{-1}$			44	45	#
Moisture content	%			7.1	7.1	#
O_2	%			15.7	15.7	#
CO_2	%			2.8	3.3	#
Dry standard flow rate	dscm/min			6,300	6,500	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	70	70	70	70	70
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3			69	55	#
NO_X (as NO_2)	mg/m^3			61	48	#
NO_X (as NO_2) Emission Rate	g/min			390	310	#
CO (Corrected)	mg/dscm			17	23	#
CO	mg/m^3			15	20	#
CO Emission Rate	g/min			95	130	#
CO Emission Rate	g/sec			1.6	2.2	#
NO_X (as NO_2) Emission Rate	g/sec			6.5	5.2	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 102A Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant			Ektimo		Ektimo	Ektimo
Unit		102A	102A	102A	102A	102A
Date		29-Apr-19	8-Jul-09	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		No Test	16:07	No Test	8:03	#
End Time			17:06		9:02	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	°C		433		**442**	#
Gas Velocity	m s^{-1}		44		43	#
Moisture content	%		7.8		6.2	#
O_2	%		15.8		15.8	#
CO_2	%		2.7		2.4	#
Dry standard flow rate	dscm/min		6,400		6,500	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	**70**	**70**	**70**	**70**	**70**
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3		69		62	#
NO_X (as NO_2)	mg/m^3		59		54	#
NO_X (as NO_2) Emission Rate	g/min		380		350	#
CO (Corrected)	mg/dscm		38		44	#
CO	mg/m^3		33		38	#
CO Emission Rate	g/min		210		240	#
CO Emission Rate	g/sec		3.5		4.0	#
NO_X (as NO_2) Emission Rate	g/sec		6.3		5.8	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 102B Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant			Ektimo		Ektimo	
Unit		102B	102B	102B	102B	102B
Date		29-Apr-19	27-Jun-19	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		No Test	10:31	No Test	8:18	#
End Time			11:30		9:17	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	^{o}C		449		454	#
Gas Velocity	$m\ s^{-1}$		45		47	#
Moisture content	%		7.7		6.5	#
O_2	%		15.4		15.3	#
CO_2	%		2.9		3.4	#
Dry standard flow rate	dscm/min		6,400		6,900	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	70	70	70	70	70
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3		68		66	#
NO_X (as NO_2)	mg/m^3		63		63	#
NO_X (as NO_2) Emission Rate	g/min		410		430	#
CO (Corrected)	mg/dscm		48		23	#
CO	mg/m^3		45		22	#
CO Emission Rate	g/min		290		150	#
CO Emission Rate	g/sec		4.8		2.5	#
NO_X (as NO_2) Emission Rate	g/sec		6.8		7.2	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 103A Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant			Ektimo		Ektimo	
Unit		103A	103A	103A	103A	103A
Date		29-Apr-19	27-Jun-19	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		No Test	13:23	No Test	11:46	#
End Time			14:21		12:45	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	^{o}C		448		475	#
Gas Velocity	$m\ s^{-1}$		44		49	#
Moisture content	%		7.5		7.4	#
O_2	%		15.5		15.1	#
CO_2	%		2.8		3.1	#
Dry standard flow rate	dscm/min		6300.0		6,900	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	70	70	70	70	70
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3		59		59	#
NO_X (as NO_2)	mg/m^3		54		58	#
NO_X (as NO_2) Emission Rate	g/min		340		400	#
CO (Corrected)	mg/dscm		49		32	#
CO	mg/m^3		45		31	#
CO Emission Rate	g/min		280		210	#
CO Emission Rate	g/sec		4.7		3.5	#
NO_X (as NO_2) Emission Rate	g/sec		5.7		6.7	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 104 (Rolls Royce OCGT) Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant		Ektimo	Ektimo		Ektimo	
Unit		104	104	104	104	104
Date		29-Apr-19	27-Jun-19	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		11:17	8:37	No Test	14:25	#
End Time		12:16	9:36		15:24	#
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	^{o}C	443	459		412	#
Gas Velocity	$m\ s^{-1}$	36	39		34	#
Moisture content	%	7.1	7.8		6.8	#
O_2	%	14.7	14.6		14.5	#
CO_2	%	3.7	3.4		3.3	#
Dry standard flow rate	dscm/min	7,900	8400.0		8,000	#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	60	60	60	60	60
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3	54	44		37	#
NO_X (as NO_2)	mg/m^3	57	47		40	#
NO_X (as NO_2) Emission Rate	g/min	450	390		320	#
CO (Corrected)	mg/dscm	33	82		44	#
CO	mg/m^3	335	87		48	#
CO Emission Rate	g/min	280	730		380	#
CO Emission Rate	g/sec	4.7	12.2		6.3	#
NO_X (as NO_2) Emission Rate	g/sec	7.5	6.5		5.3	#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

Unit 201 (Mitsubishi CCGT) Stack Testing Results

(AER reporting Period 1 April 2019 to 31 March 2020)

Stack Testing Consultant		Ektimo				
Unit		201	201	201	201	201
Date		29-Apr-19	8-Jun-19	5/08/2019*	17-Dec-19	1-Mar-20
Start Time		8:56	Offline	Offline	Offline	Offline #
End Time		9:56				
Parameter	Unit	Value	Value	Value	Value	Value
Gas Temperature	^{o}C	104				#
Gas Velocity	$m\ s^{-1}$	26				#
Moisture content	%	7.4				#
O_2	%	15.1				#
CO_2	%	3.5				#
Dry standard flow rate	dscm/min	25,000				#
EPN Limit for Corrected NOx (as NO_2 @ 15% O_2)	mg/m^3	60	60	60	60	60
Corrected NO_x (as NO_2 @ 15% O_2)	mg/m^3	55				#
NO_X (as NO_2)	mg/m^3	54				#
NO_X (as NO_2) Emission Rate	g/min	1,300				#
CO (Corrected)	mg/dscm	28				#
CO	mg/m^3	27				#
CO Emission Rate	g/min	680				#
CO Emission Rate	g/sec	11.3				#
NO_X (as NO_2) Emission Rate	g/sec	21.7				#

NOTES:

STP = 0°C, 101.3kPa

(Dry Standard Cubic Metre) dscm/min = m3/min

LEGEND:

Offline	No quarterly stack testing was undertaken on the Mitsubishi CCGT as it was in dry lay-up.
No Test	Unit not tested during this sampling round as was tested by AirLabs Environmental on 21st and 22nd March 2019.
No Test	No testing as power generating equipment was not in operation or the timing of operation could not be predicted.
	The NO_x stack emission was compliant with relevant EPN limit.
#	The test scheduled for March 2020 had to be cancelled due to COVID-19 pandemic restrictions.
*	Scheduling of further testing during Septemebr was not possible due to low power generation.

Printed: 4/06/2020

APPENDIX E2

Emission Testing Report

(Report No. R007479)

(Ektimo Pty Ltd, 9 May 2019)

(Units Tested: Units 104 and U201)

Ektimo

Address (Head Office)
7 Redland Drive
MITCHAM VIC 3132

Postal Address
52 Cooper Road
COCKBURN CENTRAL WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN: 86 600 381 413

Report Number R007479

Emission Testing Report

AETV Pty Ltd, Georgetown

Document Information

Client Name:	AETV Pty Ltd
Report Number:	R007479
Date of Issue:	9 May 2019
Attention:	Chris Ashley
Address:	East Tamar Highway Georgetown TAS 7253
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R007479	9/05/2019	JWe	GTr	MHu
Amend Report	-	-	-	-	-

Template Version: 171218

Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation

Glenn Trenear
Client Manager

NATA Accredited Laboratory
No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

Ektimo was engaged by AETV Pty Ltd to perform emission monitoring.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
U104	29 April 2019	Nitrogen oxides (NO_X), carbon monoxide, carbon dioxide, oxygen
U201		

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

2 LICENCE COMPARISON

The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the Tasmanian Environmental Protection Notice (EPN) as per licence EPN 7898/1.

Location Description	Pollutant	Units	Licence limit	Detected values
U104	Oxides of nitrogen (as NO_2)	mg/m^3	NA	57
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	60	54
	Carbon Monoxide	mg/m^3	NA	35
U201	Oxides of nitrogen (as NO_2)	mg/m^3	NA	54
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	60	55
	Carbon Monoxide	mg/m^3	NA	27

3 RESULTS

3.1 U104

Date	29/04/2019	**Client**	AETV Pty Ltd
Report	R007479	**Stack ID**	U104
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear	**State**	TAS
Process Conditions	Unit 104 running at 58 MW		190410

Sampling Plane Details	
Sampling plane dimensions	3640 mm
Sampling plane area	10.4 m²
Sampling port size, number & depth	4" BSP (x4), 300 mm
Access & height of ports	Stairs & fixed ladder 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1 D
Upstream disturbance	Change in diameter 5 D
No. traverses & points sampled	2 28
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.1	
Gas molecular weight, g/g mole	28.5 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.31 (dry)
% Oxygen correction & Factor	15 %	0.95
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1110 & 1220	
Temperature, °C	443	
Velocity at sampling plane, m/s	36	
Volumetric flow rate, actual, m³/min	22000	
Volumetric flow rate (wet STP), m³/min	8500	
Volumetric flow rate (dry STP), m³/min	7900	
Mass flow rate (wet basis), kg/hour	650000	
Velocity difference, %	<1	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1117 - 1216			1117 - 1216			1117 - 1216		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	57	54	450	49	46	390	59	56	470
Carbon monoxide	35	33	280	29	27	230	37	35	300
	Concentration %			Concentration %			Concentration %		
Carbon dioxide	3.7			3.1			3.7		
Oxygen	14.7			14.6			15.6		

3.2 U201

Date	29/04/2019	**Client**	AETV Pty Ltd
Report	R007479	**Stack ID**	U201
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear	**State**	TAS
Process Conditions	Unit 201 running at 208 MW		190410

Sampling Plane Details	
Sampling plane dimensions	5500 mm
Sampling plane area	23.8 m²
Sampling port size, number & depth	4" Flange (x6), 300 mm
Access & height of ports	Stairs 35 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	3 42
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.4	
Gas molecular weight, g/g mole	28.5 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.31 (dry)
% Oxygen correction & Factor	15 %	1.01
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0850 & 1000	
Temperature, °C	104	
Velocity at sampling plane, m/s	26	
Volumetric flow rate, actual, m³/min	37000	
Volumetric flow rate (wet STP), m³/min	27000	
Volumetric flow rate (dry STP), m³/min	25000	
Mass flow rate (wet basis), kg/hour	2000000	
Velocity difference, %	2	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0856 - 0956			0856 - 0956			0856 - 0956		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	54	55	1300	51	52	1300	56	57	1400
Carbon monoxide	27	28	680	21	21	530	32	33	800
		Concentration %			Concentration %			Concentration %	
Carbon dioxide		3.5			3.5			3.6	
Oxygen		15.1			15			15.1	

4 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	-	✓	NA
Flow rate, temperature and velocity	ISO 10780	NA	8%, 2%, 7%	✓	NA
Moisture (stacks ≥60°C)	USEPA Alt-008	USEPA Alt-008	19%	✓	✓
Molecular weight	USEPA 3A	USEPA 3A	not specified	✓	✓
Carbon dioxide	USEPA 3A	USEPA 3A	13%	✓	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	✓	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	✓	✓
Oxygen	USEPA 3A	USEPA 3A	13%	✓	✓

180404

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

5 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

6 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.

APPENDIX E3

Quarter Two Compliance Emission Testing Report (Report No. R007606)

(Ektimo Pty Ltd, 17 July 2019)

(Units Tested: U102-A, U102-B, U103-A and U104)

Ektimo

Address (Head Office)
7 Redland Drive
MITCHAM VIC 3132

Postal Address
52 Cooper Road
COCKBURN CENTRAL WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN: 86 600 381 413

Report Number R007607

Quarter Two Compliance - 2019
Emission Testing Report

AETV Pty Ltd, Georgetown

Document Information

Client Name:	AETV Pty Ltd
Report Number:	R007607
Date of Issue:	17 July 2019
Attention:	Chris Ashley
Address:	East Tamar Highway Georgetown TAS 7253
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R007607	17/07/2019	JWe	GTr	SDo
Amend Report	-	-	-	-	-

Template Version: 180619

Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation

Glenn Trenear
Client Manager

NATA Accredited Laboratory
No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

Ektimo was engaged by AETV Pty Ltd to perform emission monitoring as part of ongoing monitoring requirements pursuant to EPN licence 7898/1.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
U102-A	8 July 2019	Nitrogen oxides (NO_X), carbon monoxide, carbon dioxide, oxygen
U102-B	27 June 2019	
U103-A		
U104		

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

2 LICENCE COMPARISON

The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the Tasmanian Environmental Protection Notice (EPN) as per licence EPN 7898/1.

Location Description	Pollutant	Units	Licence limit	Detected values
U102-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	59
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	69
	Carbon Monoxide	mg/m^3	NA	33
U102-B	Oxides of nitrogen (as NO_2)	mg/m^3	NA	63
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	68
	Carbon Monoxide	mg/m^3	NA	45
U103-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	54
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	59
	Carbon Monoxide	mg/m^3	NA	45
U104	Oxides of nitrogen (as NO_2)	mg/m^3	NA	47
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	60	44
	Carbon Monoxide	mg/m^3	NA	87

3 RESULTS

3.1 U102-A

Date	8/07/2019	**Client**	AETV Pty Ltd
Report	R007607	**Stack ID**	U102-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G. Trenear, J. Cacchioni	**State**	TAS
Process Conditions	Unit 102-A & B running at 40 MW(combined load)		190617

Sampling Plane Details	
Sampling plane dimensions	4060 x 1700 mm
Sampling plane area	6.9 m²
Sampling port size, number & depth	4" BSP (x9), 90 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	6 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.8	
Gas molecular weight, g/g mole	28.3 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.17
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1600 & 1708	
Temperature, °C	433	
Velocity at sampling plane, m/s	44	
Volumetric flow rate, actual, m³/min	18000	
Volumetric flow rate (wet STP), m³/min	7000	
Volumetric flow rate (dry STP), m³/min	6400	
Mass flow rate (wet basis), kg/hour	530000	
Velocity difference, %	3	

Gas Analyser Results	Average		
Sampling time	1607 - 1706		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases			
Nitrogen oxides (as NO_2)	59	69	380
Carbon monoxide	33	38	210
	Concentration %		
Carbon dioxide	2.7		
Oxygen	15.8		

3.2 U102-B

Date	27/06/2019	**Client**	AETV Pty Ltd
Report	R007607	**Stack ID**	U102-B
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	Mathew Hutton, Toby Belfitt	**State**	TAS
Process Conditions	Unit 102-A & B running at 40 MW(combined load)		151112

Sampling Plane Details	
Sampling plane dimensions	4060 x 1700 mm
Sampling plane area	6.9 m²
Sampling port size, number & depth	4" BSP (x9), 90 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	6 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.7	
Gas molecular weight, g/g mole	28.3 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.08
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1030 & 1135	
Temperature, °C	449	
Velocity at sampling plane, m/s	45	
Volumetric flow rate, actual, m³/min	19000	
Volumetric flow rate (wet STP), m³/min	7000	
Volumetric flow rate (dry STP), m³/min	6400	
Mass flow rate (wet basis), kg/hour	530000	
Velocity difference, %	1	

Gas Analyser Results	Average		
Sampling time	1031 - 1130		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases			
Nitrogen oxides (as NO_2)	63	68	410
Carbon monoxide	45	48	290
	Concentration %		
Carbon dioxide	2.9		
Oxygen	15.4		

3.3 U103-A

Date	27/06/2019	**Client**	AETV Pty Ltd
Report	R007607	**Stack ID**	U103-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	Mathew Hutton, Toby Belfitt	**State**	TAS
Process Conditions	Unit 103-A running at 20MW		191114

Sampling Plane Details		
Sampling plane dimensions	4060 x 1700 mm	
Sampling plane area	6.9 m²	
Sampling port size, number & depth	4" BSP (x9), 90 mm	
Access & height of ports	Elevated work platform	10 m
Duct orientation & shape	Vertical	Rectangular
Downstream disturbance	Exit	1.5 D
Upstream disturbance	Change in diameter	3 D
No. traverses & points sampled	6	24
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.5	
Gas molecular weight, g/g mole	28.4 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.09
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1300 & 1425	
Temperature, °C	448	
Velocity at sampling plane, m/s	44	
Volumetric flow rate, actual, m³/min	18000	
Volumetric flow rate (wet STP), m³/min	6800	
Volumetric flow rate (dry STP), m³/min	6300	
Mass flow rate (wet basis), kg/hour	520000	
Velocity difference, %	3	

Gas Analyser Results	Average		
Sampling time	1323 - 1421		
		Corrected to	
	Concentration mg/m³	15% O2 mg/m³	Mass Rate g/min
Combustion Gases			
Nitrogen oxides (as NO_2)	54	59	340
Carbon monoxide	45	49	280
	Concentration %		
Carbon dioxide	2.8		
Oxygen	15.5		

3.4 U104

Date	27/06/2019	**Client**	AETV Pty Ltd
Report	R007607	**Stack ID**	U104
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	Mathew Hutton, Toby Belfitt	**State**	TAS
Process Conditions	Unit 104 running at 58 MW		181112

Sampling Plane Details		
Sampling plane dimensions	3640 mm	
Sampling plane area	10.4 m²	
Sampling port size, number & depth	4" BSP (x4), 300 mm	
Access & height of ports	Stairs & fixed ladder	10 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Exit	1 D
Upstream disturbance	Change in diameter	5 D
No. traverses & points sampled	2	28
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.8	
Gas molecular weight, g/g mole	28.4 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	0.94
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0830 & 0939	
Temperature, °C	459	
Velocity at sampling plane, m/s	39	
Volumetric flow rate, actual, m³/min	25000	
Volumetric flow rate (wet STP), m³/min	9100	
Volumetric flow rate (dry STP), m³/min	8400	
Mass flow rate (wet basis), kg/hour	690000	
Velocity difference, %	2	

Gas Analyser Results	Average		
Sampling time	0837 - 0936		
		Corrected to 15%	
	Concentration	O2	Mass Rate
Combustion Gases	mg/m³	mg/m³	g/min
Nitrogen oxides (as NO_2)	47	44	390
Carbon monoxide	87	82	730
	Concentration		
	%		
Carbon dioxide	3.4		
Oxygen	14.6		

4 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	ISO 10780	8%, 2%, 7%	NA	✓
Moisture	USEPA Alt-008	USEPA Alt-008	19%	✓	✓
Carbon dioxide and oxygen	NA	USEPA 3A	13%	NA	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	✓	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	✓	✓

190514

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

5 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

6 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.

APPENDIX E4

Emission Testing Report (Report No. R008047)

(Ektimo Pty Ltd, 20 August 2019)

(Units Tested: U101-A and U101-B)

Ektimo

Address (Head Office)
7 Redland Drive
MITCHAM VIC 3132

Postal Address
52 Cooper Road
COCKBURN CENTRAL WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN: 86 600 381 413

Report Number R008047

Emission Testing Report
AETV Pty Ltd, Georgetown

Document Information

Client Name:	AETV Pty Ltd
Report Number:	R008047
Date of Issue:	20 August 2019
Attention:	Chris Ashley
Address:	East Tamar Highway Georgetown TAS 7253
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R008047	20/08/2019	JWe	GTr	MHu
Amend Report	-	-	-	-	-

Template Version: 180619

Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation

Glenn Trenear
Client Manager

NATA Accredited Laboratory
No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

Ektimo was engaged by AETV Pty Ltd to perform emission monitoring as part of ongoing monitoring requirements pursuant to EPN licence 7898/1.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
U101 A and B	5 August 2019	Nitrogen oxides (NO_X) Carbon monoxide Carbon dioxide Oxygen

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

2 LICENCE COMPARISON

The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the Tasmanian Environmental Protection Notice (EPN) as per licence EPN 7898/1.

Location Description	Pollutant	Units	Licence limit	Detected values
U101-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	62
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	67
	Carbon Monoxide	mg/m^3	NA	19
U101-B	Oxides of nitrogen (as NO_2)	mg/m^3	NA	62
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	69
	Carbon Monoxide	mg/m^3	NA	15

3 RESULTS

3.1 U101-A

Date	5/08/2019	**Client**	AETV Pty Ltd
Report	R008047	**Stack ID**	U101-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	Mathew Hutton, Tobe Belfitt	**State**	VIC
Process Conditions	Unit 101-A & B running at 40 MW(combined load)		*190801*

Sampling Plane Details	
Sampling plane dimensions	4060 x 1700 mm
Sampling plane area	6.9 m²
Sampling port size, number & depth	4" BSP (x9), 90 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	6 24
Sample plane compliance to AS4323.1 & EPA Pub. 440.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.2	
Gas molecular weight, g/g mole	28.4 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.09
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1200 & 1340	
Temperature, °C	443	
Velocity at sampling plane, m/s	46	
Volumetric flow rate, actual, m³/min	19000	
Volumetric flow rate (wet STP), m³/min	7300	
Volumetric flow rate (dry STP), m³/min	6700	
Mass flow rate (wet basis), kg/hour	550000	
Velocity difference, %	1	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1222 - 1321			1222 - 1321			1222 - 1321		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	62	67	420	60	65	400	64	69	430
Carbon monoxide	19	21	130	15	16	100	21	23	140
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	3			2.9			3		
Oxygen	15.5			15.5			15.6		

3.2 U101-B

Date	5/08/2019	**Client**	AETV Pty Ltd
Report	R008047	**Stack ID**	U101-B
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	Mathew Hutton, Tobe Belfitt	**State**	VIC
Process Conditions	Unit 101-A & B running at 40 MW(combined load)		190801

Sampling Plane Details	
Sampling plane dimensions	4060 x 1700 mm
Sampling plane area	6.9 m²
Sampling port size, number & depth	4" BSP (x9), 90 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	6 24
Sample plane compliance to AS4323.1 & EPA Pub. 440.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.1	
Gas molecular weight, g/g mole	28.4 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.13
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1311 & 1435	
Temperature, °C	452	
Velocity at sampling plane, m/s	44	
Volumetric flow rate, actual, m³/min	18000	
Volumetric flow rate (wet STP), m³/min	6800	
Volumetric flow rate (dry STP), m³/min	6300	
Mass flow rate (wet basis), kg/hour	520000	
Velocity difference, %	1	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1316 - 1416			1316 - 1416			1316 - 1416		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	61	69	390	58	65	360	64	73	410
Carbon monoxide	15	17	95	14	16	87	16	18	100
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	2.8			2.7			2.8		
Oxygen	15.7			15.6			15.8		

4 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	ISO 10780	8%, 2%, 7%	NA	✓
Moisture	USEPA Alt-008	USEPA Alt-008	19%	✓	✓
Molecular weight	NA	USEPA 3	not specified	NA	✓
Carbon dioxide and oxygen	NA	USEPA 3A	13%	NA	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	✓	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	✓	✓

190808

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

5 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

6 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.

APPENDIX E5

Quarter Four Compliance 2019 Emission Testing Report

(Report No. R007914)

(Ektimo Pty Ltd, 23 January 2020)

[Units Tested: FT8s (U101-A, U101-B, U102-A, U102-B, U103-A) and U104]

Ektimo

REPORT NUMBER R007914

Quarter Four Compliance - 2019
Emission Testing Report
AETV Pty Ltd, Georgetown

Document Information

Template Version; 121219

Client Name:	AETV Pty Ltd
Report Number:	R007914
Date of Issue:	23 January 2020
Attention:	Chris Ashley
Address:	East Tamar Highway Georgetown TAS 7253
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

NATA Accredited Laboratory
No. 14601

Glenn Trenear
Client Manager

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

1.1 Background

Ektimo was engaged by AETV Pty Ltd to perform emission testing at their Georgetown plant. Testing was carried out in accordance with Environmental Licence 7898/1.

1.2 Project Objectives

The objectives of the project were to conduct a monitoring programme to quantify emissions from six discharge points to determine compliance with AETV Pty Ltd's Environmental Licence.

Monitoring was performed as follows;

Location	Test Date	Test Parameters*
U101-A	17 December 2019	Nitrogen oxides (NO_X), carbon monoxide, carbon dioxide, oxygen
U101-B		
U102-A		
U102-B		
U103-A		
U104		

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit and all analytes highlighted in red are outside the licence limit set by the Tasmanian Environmental Protection Notice (EPN) as per licence EPN 7898/1

Location Description	Pollutant	Units	Licence Limit	Detected Values
U101-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	54
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	57
	Carbon Monoxide	mg/m^3	NA	17
U101-B	Oxides of nitrogen (as NO_2)	mg/m^3	NA	48
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	55
	Carbon Monoxide	mg/m^3	NA	20
U102-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	54
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	62
	Carbon Monoxide	mg/m^3	NA	38
U102-B	Oxides of nitrogen (as NO_2)	mg/m^3	NA	63
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	66
	Carbon Monoxide	mg/m^3	NA	22
U103-A	Oxides of nitrogen (as NO_2)	mg/m^3	NA	58
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	70	59
	Carbon Monoxide	mg/m^3	NA	31
U104	Oxides of nitrogen (as NO_2)	mg/m^3	NA	40
	Oxides of nitrogen (as NO_2) Corrected to 15% O_2	mg/m^3	60	37
	Carbon Monoxide	mg/m^3	NA	48

Please note that the measurement uncertainty associated with the test results was not considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

2 RESULTS

2.1 U101-A

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U101-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 101-A & B running at 40 MW(combined load)		191029

Sampling Plane Details		
Sampling plane dimensions	4060 x 1700 mm	
Sampling plane area	6.9 m²	
Sampling port size, number & depth	4" BSP (x9), 90 mm	
Access & height of ports	Elevated work platform	10 m
Duct orientation & shape	Vertical	Rectangular
Downstream disturbance	Exit	1.5 D
Upstream disturbance	Change in diameter	3 D
No. traverses & points sampled	6	24
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	6.5	
Gas molecular weight, g/g mole	28.5 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.06
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0945 & 1054	
Temperature, °C	469	
Velocity at sampling plane, m/s	50	
Volumetric flow rate, actual, m³/min	21000	
Volumetric flow rate (wet STP), m³/min	7600	
Volumetric flow rate (dry STP), m³/min	7100	
Mass flow rate (wet basis), kg/hour	580000	
Velocity difference, %	-4	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0950 - 1049			0950 - 1049			0950 - 1049		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	54	57	380	50	53	360	56	59	400
Carbon monoxide	17	18	120	15	16	110	19	20	130
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	2.9			2.8			3		
Oxygen	15.4			15.2			15.5		

2.2 U101-B

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U101-B
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 101-A & B running at 40 MW(combined load)		191029

Sampling Plane Details		
Sampling plane dimensions	4060 x 1700 mm	
Sampling plane area	6.9 m²	
Sampling port size, number & depth	4" BSP (x9), 90 mm	
Access & height of ports	Elevated work platform 10 m	
Duct orientation & shape	Vertical Rectangular	
Downstream disturbance	Exit 1.5 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	6 24	
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.1	
Gas molecular weight, g/g mole	28.5 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.31 (dry)
% Oxygen correction & Factor	15 %	1.14
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0953 & 1100	
Temperature, °C	447	
Velocity at sampling plane, m/s	45	
Volumetric flow rate, actual, m³/min	18000	
Volumetric flow rate (wet STP), m³/min	7000	
Volumetric flow rate (dry STP), m³/min	6500	
Mass flow rate (wet basis), kg/hour	540000	
Velocity difference, %	<1	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0956 - 1056			0956 - 1056			0956 - 1056		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	48	55	310	40	46	260	52	60	340
Carbon monoxide	20	23	130	17	20	110	22	26	150
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	3.3			3.2			3.3		
Oxygen	15.7			15.6			15.8		

2.3 U102-A

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U102-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 102-A & B running at 40 MW(combined load)		191029

Sampling Plane Details		
Sampling plane dimensions	4060 x 1700 mm	
Sampling plane area	6.9 m²	
Sampling port size, number & depth	4" BSP (x9), 90 mm	
Access & height of ports	Elevated work platform 10 m	
Duct orientation & shape	Vertical Rectangular	
Downstream disturbance	Exit 1.5 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	6 24	
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	6.2	
Gas molecular weight, g/g mole	28.5 (wet)	29.1 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.16
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0801 & 0908	
Temperature, °C	442	
Velocity at sampling plane, m/s	43	
Volumetric flow rate, actual, m³/min	18000	
Volumetric flow rate (wet STP), m³/min	6900	
Volumetric flow rate (dry STP), m³/min	6500	
Mass flow rate (wet basis), kg/hour	520000	
Velocity difference, %	2	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0803 - 0902			0803 - 0902			0803 - 0902		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	54	62	350	47	55	300	57	66	370
Carbon monoxide	38	44	240	31	36	200	45	52	290
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	2.4			2			2.6		
Oxygen	15.8			15.7			16.7		

2.4 U102-B

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U102-B
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 102-A & B running at 40 MW(combined load)		191029

Sampling Plane Details		
Sampling plane dimensions	4060 x 1700 mm	
Sampling plane area	6.9 m²	
Sampling port size, number & depth	4" BSP (x9), 90 mm	
Access & height of ports	Elevated work platform 10 m	
Duct orientation & shape	Vertical Rectangular	
Downstream disturbance	Exit 1.5 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	6 24	
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	6.5	
Gas molecular weight, g/g mole	28.5 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.31 (dry)
% Oxygen correction & Factor	15 %	1.06
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0813 & 0920	
Temperature, °C	454	
Velocity at sampling plane, m/s	47	
Volumetric flow rate, actual, m³/min	20000	
Volumetric flow rate (wet STP), m³/min	7400	
Volumetric flow rate (dry STP), m³/min	6900	
Mass flow rate (wet basis), kg/hour	560000	
Velocity difference, %	-3	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0818 - 0917			0818 - 0917			0818 - 0917		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	63	66	430	58	61	400	67	72	460
Carbon monoxide	22	23	150	<2	<2	<10	40	42	280
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	3.4			3.3			3.5		
Oxygen	15.3			15.3			15.5		

2.5 U103-A

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U103-A
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 103-A running at 22 MW		191029

Sampling Plane Details	
Sampling plane dimensions	4060 x 1700 mm
Sampling plane area	6.9 m²
Sampling port size, number & depth	4" BSP (x9), 90 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	6 24
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	7.4	
Gas molecular weight, g/g mole	28.4 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	1.02
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1145 & 1248	
Temperature, °C	475	
Velocity at sampling plane, m/s	49	
Volumetric flow rate, actual, m³/min	20000	
Volumetric flow rate (wet STP), m³/min	7400	
Volumetric flow rate (dry STP), m³/min	6900	
Mass flow rate (wet basis), kg/hour	570000	
Velocity difference, %	-3	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1146 - 1245			1146 - 1245			1146 - 1245		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	58	59	400	52	53	360	61	62	420
Carbon monoxide	31	32	210	29	29	200	34	34	230
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	3.1			3.1			3.2		
Oxygen	15.1			15.1			15.2		

2.6 U104

Date	17/12/2019	**Client**	AETV Pty Ltd
Report	R007914	**Stack ID**	U104
Licence No.	EPN 7898/1	**Location**	Georgetown
Ektimo Staff	G Trenear & E Camilleri	**State**	TAS
Process Conditions	Unit 104 running at 58 MW		191029

Sampling Plane Details	
Sampling plane dimensions	3640 mm
Sampling plane area	10.4 m²
Sampling port size, number & depth	4" BSP (x4), 300 mm
Access & height of ports	Stairs & fixed ladder 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1 D
Upstream disturbance	Change in diameter 5 D
No. traverses & points sampled	2 28
Sample plane compliance to AS4323.1	Compliant but non-ideal

Comments

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	6.8	
Gas molecular weight, g/g mole	28.5 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	15 %	0.92
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1422 & 1526	
Temperature, °C	412	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/min	21000	
Volumetric flow rate (wet STP), m³/min	8600	
Volumetric flow rate (dry STP), m³/min	8000	
Mass flow rate (wet basis), kg/hour	650000	
Velocity difference, %	<1	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1425 - 1524			1425 - 1524			1425 - 1524		
	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 15% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	40	37	320	31	28	250	42	39	330
Carbon monoxide	48	44	380	46	43	370	51	47	410
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	3.3			3.3			3.3		
Oxygen	14.5			14.5			14.5		

3 TEST METHODS

All sampling and analysis performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	ISO 10780	8%, 2%, 7%	NA	✓
Moisture	USEPA Alt-008	USEPA Alt-008	19%	✓	✓
Carbon dioxide and oxygen	NA	USEPA 3A	13%	NA	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	✓	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	✓	✓

200108

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

4 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

5 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity Difference	The percentage difference between the average of initial flows and afterflows.
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result is outside this range.

Address (Head Office)
7 Redland Drive
Mitcham VIC 3132

Postal Address
52 Cooper Road
Cockburn Central WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN 86 600 381 413

APPENDIX F

Tamar Valley Power Station Environmental Noise Survey 2019 (Report No.5266_AC_R_R1) (Tarkarri Engineering Pty Ltd, May 2019)

AETV Power

Tamar Valley Power Station environmental noise survey 2019

Report No. 5266_AC_R_R1

TARKARRI ENGINEERING PTY LTD
PO Box 506
Kings Meadows TAS 7249
May 2019

Tarkarri Engineering

Air Quality • Acoustics • Environment • Vibration

DOCUMENT CONTROL

AETV POWER
TAMAR VALLEY POWER STATION
ENVIRONMENTAL NOISE SURVEY
2019

Report No.
5266_AC_R_R1

Library Code
AC

Prepared for
AETV Power
PO Box 400
George Town
Tasmania 7253

Contact Ms Kathy Shanley
☎ +61 3 6380 2224
Mobile +61(0)408 841 819
Email Kathy.Shanley@aetvpower.com.au

Prepared by
Tarkarri Engineering Pty Ltd
PO Box 506
Kings Meadows
Tasmania 7249

Contact Dr Alex McLeod
☎ +61 3 6343 2077
Mobile +61(0)439 357 297
Email alex.mcleod@tarkarri.com

Author	Alex Lagodzki Graduate Engineer	Date: 27 May 2019
Review	Alex McLeod Director / Principal Consultant	Date: 31 May 2019

Revision History

Revision No.	Date Issued	Reason/Comments
1	4 June 2019	Corrections

Distribution

Copy No._____	Revision No.	Location
1	1	Project/Client File
2	1	Client
3	1	Tarkarri Engineering Library

Keywords environmental noise, dBA, L_{Aeq}, ambient, tone, L_{A90}, background

Table of Contents

List of figures

List of tables

References

[1] Tarkarri Engineering report 5017_AC_R_AETV Power – Tamar Valley Power Station environmental noise survey 2017

[2] Tarkarri Engineering report 5165_AC_R_AETV Power – Tamar Valley Power Station environmental noise survey 2018

Executive Summary

Tarkarri Engineering was commissioned to conduct an environmental noise survey of the AETV Power Tamar Valley Power Station. Measurements were conducted between 30 April - 16 May 2019.

Noise emission levels at sensitive receiver locations didn't exceed the applicable noise emission limits for the power station. The results of the environmental noise survey of the TVPS demonstrate that the power station operations continue to not breach the EPN noise emission limits set out in condition N1.

1 Introduction

Tarkarri Engineering was commissioned by AETV Power to conduct an environmental noise survey of the Tamar Valley Power Station (TVPS) to meet the requirements under condition N4 of Environmental Protection Notice (EPN) no. 7898/1 (r1). This report presents the results of this survey carried out during the period 30 April and 16 May 2019 and is written to meet the general requirements of condition N1 of the EPN.

2 Site description

The Tamar Valley Power Station (TVPS) site is located on the southern side of the East Tamar Highway (Hwy) on land between the Hwy and the Tamar River. To the north and north-east the land rises steeply into the Tipogoree foothills while to the south and south-west, across the Tamar River, is the rural area of Rowella where a number of noise sensitive premises are located. The George Town Golf Course is located to the north-west of the power station site where a noise sensitive premise, in the form of an apartment block, is located. Further to the west north-west lies the Bell Bay industrial area.

The power station operates 24 hrs/day 7 days a week. The site is demarcated into three operational areas as follows:

- A Mitsubishi Combined Cycle Gas Turbine (CCGT);
- A Rolls Royce Trent Open Cycle Gas Turbine (OCGT); and
- Three Pratt and Whitney FT8 Open Cycle Gas Turbines.

The Mitsubishi CCGT runs as a base load power generator while the Rolls Royce and Pratt and Whitney OCGT's are utilised during periods of peak power consumption and/or during CCGT shutdowns.

Table 2-1 presents the noise measurement position locations with those locations that are noise sensitive premises shaded in orange (the noise measurement positions were as utilised in previous surveys of the power station[1][2]). Figures 2-1 to 2-3 are aerial views of the power station site with the measurement positions clearly marked along with noise limit areas designated in the sites EPN.

Environmental noise measurement positions		
Number	Location	Coordinates (MGA94, Zone 55 G)
1	Bell Bay power station	Zone 55: 491805E / 5445498N
2	Golf course	Zone 55: 491283E / 5446023N
3	North of East Tamar Hwy	Zone 55: 492058E / 5446056N
4	Brodies Rd	Zone 55: 490371E / 5442795N
5	Wilmores Bluff (Extended monitoring location)	Zone 55: 491823E / 5443563N
6	Waterton Hall Rd	Zone 55: 492872E / 5441254N

Noise sensitive locations.

Table 2-1: Measurement locations.

Figure 2-1: Aerial view of the TVPS and surrounds with the extent of figures 2.2 and 2.3 marked.

Figure 2-2: Aerial view of environmental noise survey positions 1-3.

Figure 2-3: Aerial view of environmental noise survey positions 4-6.

3 EPN noise emission limits

The following is specified under EPN no. 7898/1 (r1):-

N1 Noise emission limits

1. Noise emissions from the activity, except within Noise Limit Areas A and B (*see figures 2-1 to 2-3 above*), when measured at any noise sensitive premises and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:
   1.1 45 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or
   1.2 40 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or
   1.3 35 dB(A) between the hours of 2200hrs and 0700hrs (Night time).
2. Noise emissions from the activity when measured at any noise sensitive premises within Noise Limit Area A and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:
   2.1 45 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or
   2.2 40 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or
   2.3 38 dB(A) between the hours of 2200hrs and 0700hrs (Night time).
3. For the purpose of these conditions '**Noise Limit Area A'** is defined as the area bounded by the low water mark of the Tamar River and a straight line joining Point Rapid to Middle Point (*in blue on figures 2-1 and 2-3 above*).

4. Noise emissions from the activity when measured at any noise sensitive premises within Noise Limit Area B and expressed as the equivalent continuous A-weighted sound pressure level must not exceed:
   4.1 50 dB(A) between the hours of 0700hrs and 1800hrs (Day time); or
   4.2 50 dB(A) between the hours of 1800hrs and 2200hrs (Evening time); or
   4.3 50 dB(A) between the hours of 2200hrs and 0700hrs (Night time).
5. For these conditions '**Noise Limit Area B**' is defined as PID 2954828, George Town Golf Course (*in yellow on figures 2-1 and 2-2 above*).
6. If the combined level of noise from the activity and the normal ambient noise exceeds the noise levels specified above, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise level by at least 5 dB(A).
7. The time interval over which noise levels are averaged must be between 10 – 20 minutes.
8. Measured noise levels must be adjusted for tonality, impulsiveness, modulation and low frequency in accordance with the Tasmanian Noise Measurement Procedures Manual.
9. The noise limit or limits applicable at any specific noise sensitive premises can be varied by the Director provided that the occupiers and owners of the noise sensitive premise give their consent in writing to the variation and to any conditions attached to the variation.

4 Instrumentation

The following instrumentation was used during the survey: -

- Remote environmental noise monitoring system with Larson Davis 831C s/n 10656.
- Environmental noise analyser Larson Davis 831 s/n 1168.
- Spectrum analyser Larson Davis 831 s/n 1169.
- Acoustic Calibrator CA250 s/n 2706.

All instruments were field calibrated prior to use and wind socks were used on microphones for all measurements.

5 Noise measurements

Observed 10-minute measurements were obtained over a 30-minute period at each of the six locations during the day, evening and night except for position 1 where single 10-minute measurements were taken. Additional measurements were also taken at position 2 and 5 at night while the peaking plant was also operating. This data has been summarised with averaged measurements presented for each location where at least two intervals were recorded. Relevant observations have also been noted. All 10-minute observed data is presented in Appendix 1.

An extended unobserved measurement was also obtained at position 5 and graphs of selected days showing the main 10-minute statistical data are provided as follows:-

- L_{Aeq}
- L_{A10}
- L_{A90}

For sake of clarity the other 5 data sets are not shown in this graph.

Spectral data was obtained at each observed measurement location and is shown graphically for each position in two data sets as follows:-

- 1/3-octave band spectra
- Narrow band data 0 to 1000 Hz (0.15625 Hz resolution)

Where appropriate, significant tones generated at the TVPS have been marked in these spectra and potential sources noted.

The following abbreviations are used in the data tables presented in the following subsections:-

- TVPS: Tamar Valley Power Station
- LF: low frequency
- BB-BA: Broadband backing alarm

5.1 Position 1 – Bell Bay power station

Position 1 is near the permanent monitoring station situated within the old Bell Bay power station.

Day and evening L_{Aeq} levels were dominated by local emissions from the plant with external traffic along the East Tamar audible at times. At night, the noise environment remained relatively unchanged. A strong tone at 348 Hz was audible and measurable and originates from a gearmesh frequency within the cooling tower fan gearbox's.

Figure 5-1: Position 1 (Archive photo).

1 – Bell Bay power station												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day	15-May-19	13:30	59.4	62.1	57.1	61.0	60.2	59.3	58.4	57.6	Fine Light NW breeze	External: Traffic (E. Tamar) TVPS: Tones LF rumble Water flow HF flow (Gas letdown)
Evening	15-May-19	21:21	60.2	62.0	58.2	61.3	60.8	60.2	59.6	58.8	Clear Calm	External: Traffic (E. Tamar) TVPS: Tones LF rumble Water flow HF flow (Gas letdown)
Night	15-May-19	23:00	59.8	61.5	58.5	60.7	60.3	59.7	59.2	58.9	Clear Calm	External: Traffic (E. Tamar) TVPS: Tones LF rumble Water flow HF flow (Gas letdown) Gearbox 348 Hz tone

Table 5-1: Position 1 Ln-statistics.

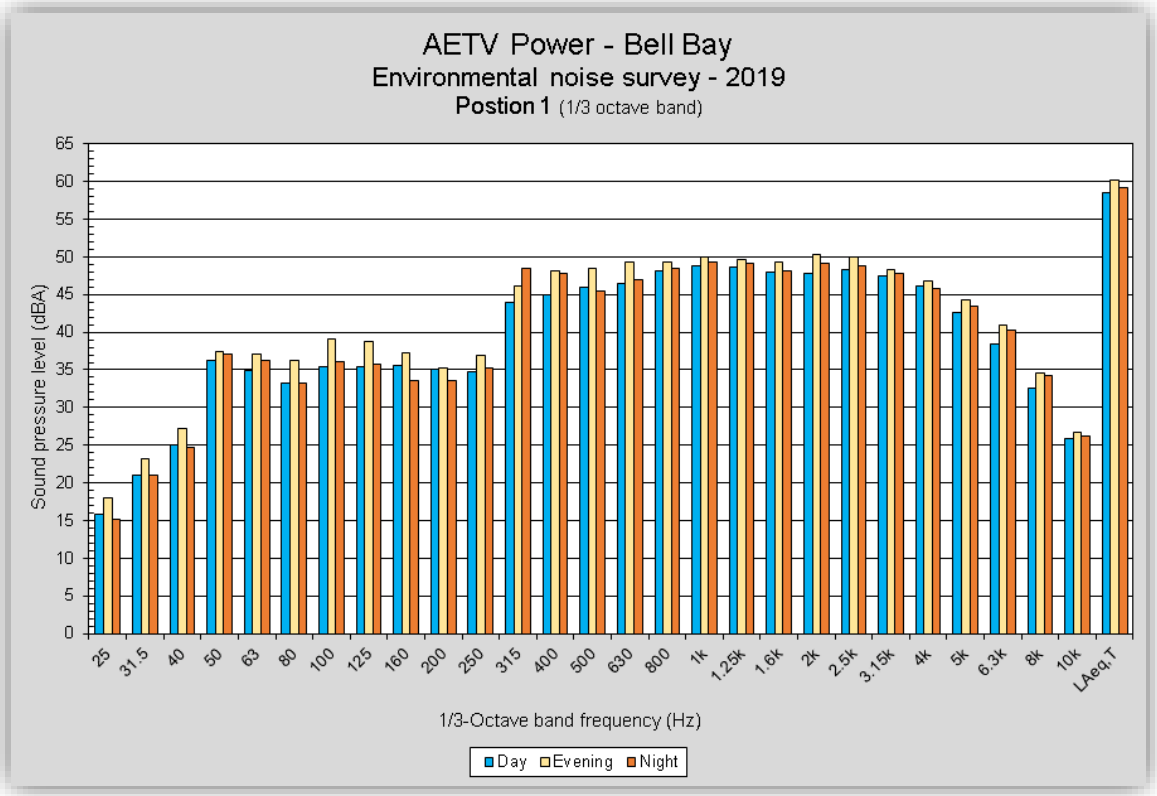


Figure 5-2: Position 1, 1/3-octave band spectrum.

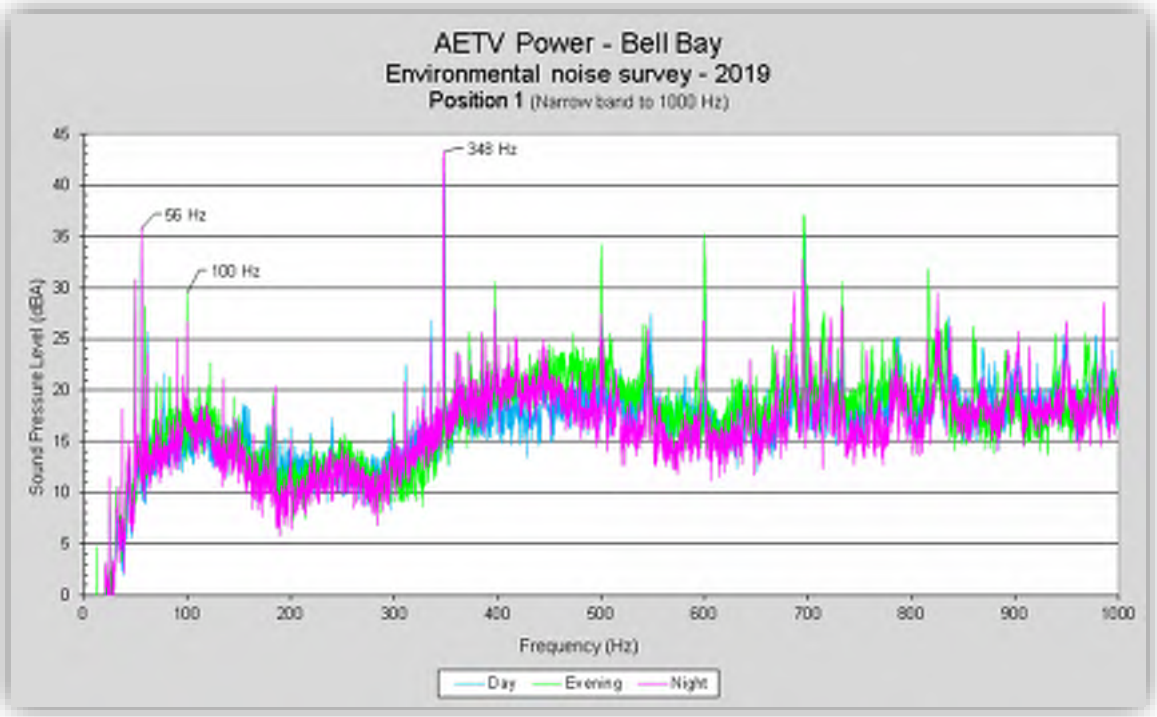


Figure 5-3: Position 1, narrow band spectrum 0 – 1000 Hz.

5.2 Position 2 – Golf course

Position 2 is located at the George Town golf course near residential units in the club house, approx. 500 m west north-west of the TVPS.

The day noise environment was dominated by East Tamar Hwy traffic with emissions from a chipper in Bell Bay and train transiting the nearby Bell Bay Line contributing also audible. Both broadband flow noise and tones were audible from the power station.

During the evening traffic noise remained significant while low frequency emissions from the Bell Bay industrial area contributed to background levels. At night, as traffic subsided, the TVPS controlled the noise environment with a 100 Hz tone particularly noticeable.

Figure 5-4: Position 2.

2 – Golf course												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day	15-May-19	12:30	44.7	58.3	37.8	51.8	47.1	43.3	40.7	39.2	Fine Light NW breeze	External: Traffic (E. Tamar) Bell Bay (Chipper) Train horn/squeal TVPS: BB flow noise Tones
Evening	15-May-19	20:30	43.2	56.9	37.4	51.7	45.5	41.1	39.1	38.3	Clear Calm	External: Traffic (E Tamar) LF rumble (Bell Bay) TVPS: Flow noise LF rumble

Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	15-May-19	23:40	45.3	53.5	42.2	50.1	46.5	44.7	43.6	42.8	Clear Calm (Fog)	External: LF rumble (Bell Bay) Traffic (E. Tamar) Frog TVPS: Tones (100 Hz) Flow noise LF rumble

Table 5-2: Position 2 Ln-statistics.

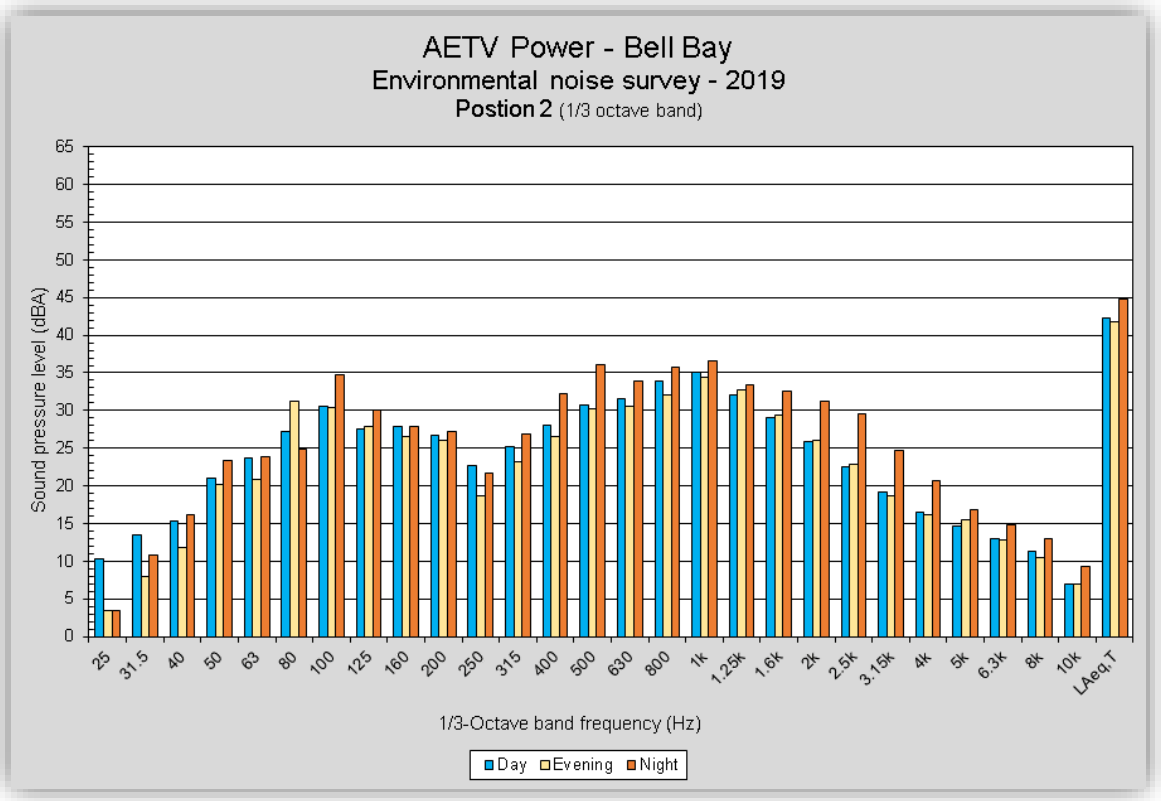


Figure 5-5: Position 2, 1/3-octave band spectrum.

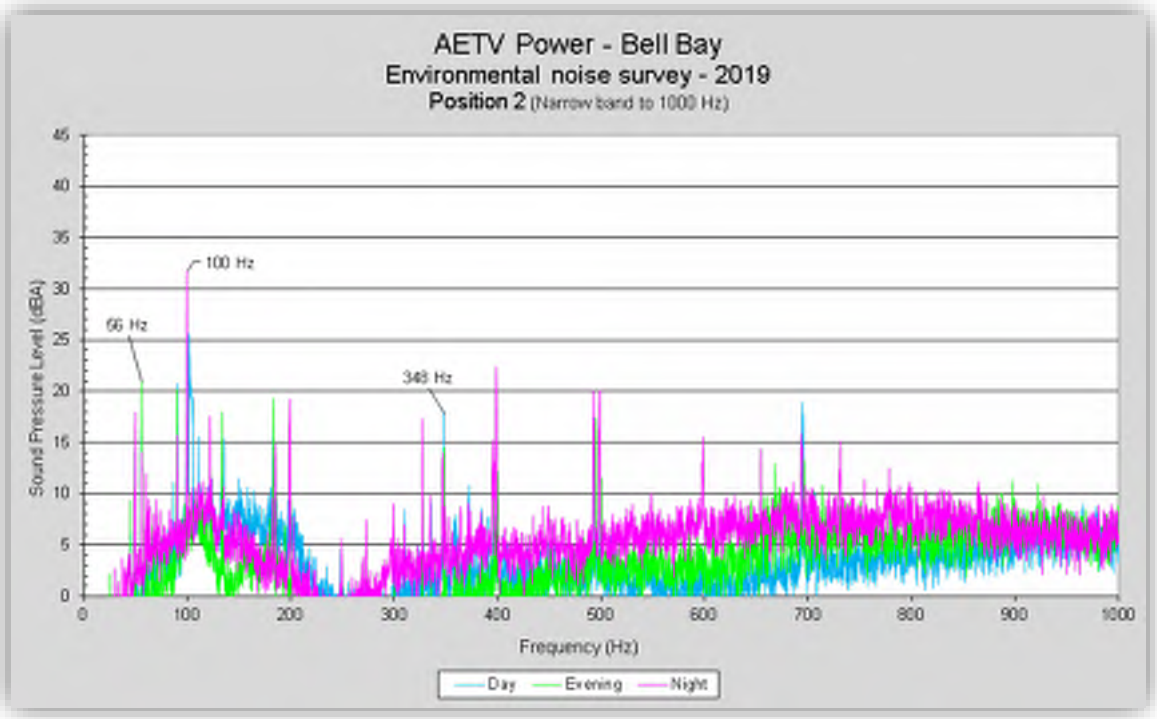


Figure 5-6: Position 2, narrow band spectrum 0 – 1000 Hz.

5.2.1 Position 2 and 2A – Golf course during peaking plant operation

At this location emissions from the TVPS were dominant and controlled the noise environment with traffic along the East Tamar Highway the only audible external source. A low frequency rumble and tone could be heard along with a broadband flow noise from the cooling towers.

An additional measurement was taken at the apartment fence boundary where topographic shielding was responsible for a reduction in measured levels.

Figure 5-7: Position 2A (Along apartment boundary fence)

2 – Golf course (Peaking plant operating)												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	30-Apr-19	23:19	47.1	52.4	44.5	50.3	48.3	46.9	45.8	45.1	Overcast Light SSE breeze	External: Traffic (E. Tamar) TVPS: LF rumble LF tone BB flow noise
Night (2A) (Apartment fence)	30-Apr-19	23:53	46.7	54.6	43.5	50.9	48.2	46.0	44.9	44.2		

Table 5-3: Position 2 and 2A Ln-statistics during peaking plant operation.

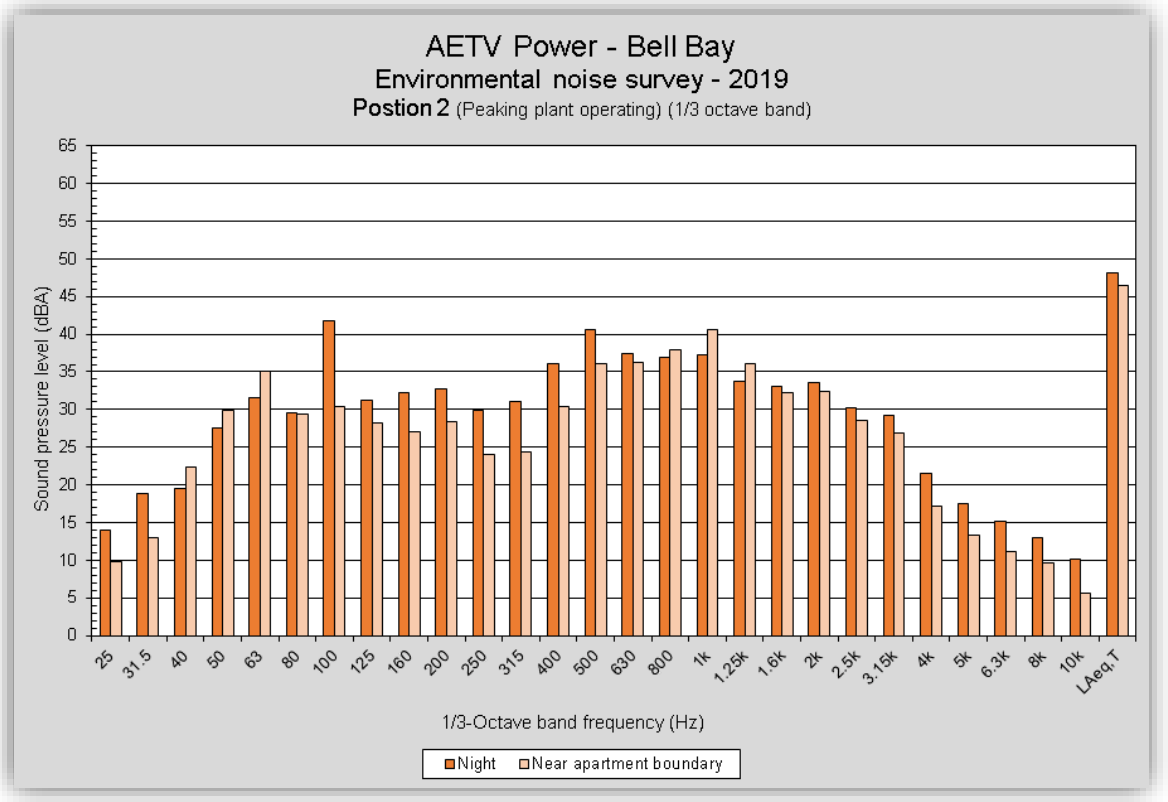


Figure 5-8: Position 2 and 2A during peaking plant operation, 1/3-octave band spectrum.

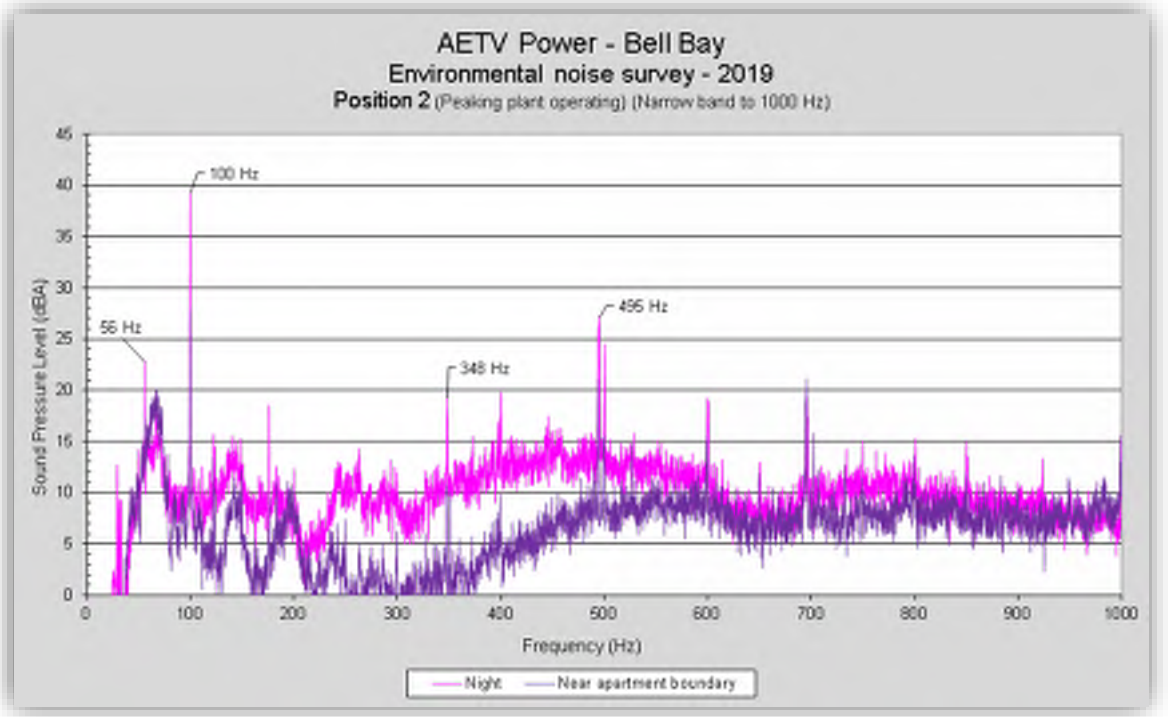


Figure 5-9: Position 2 and 2A during peaking plant operation, narrow band spectrum 0 – 1000 Hz.

5.3 Position 3 – Westwood Rd and Rowella Rd

Position 3 is approx. 300 m north of the TVPS on elevated land overlooking the power station in the Tipogoree foothills.

Noise emissions levels at this location was unchanged throughout the three measurement periods. Activity from nearby construction work was audible during the day but didn't elevate measured noise levels. Tones from the gearbox driving the cooling fans and broadband noise from the cooling towers were significant as was a low frequency rumble.

Figure 5-10: Position 3.

3 – North of East Tamar Hwy												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day	15-May-19	11:50	53.8	62.4	47.4	59.4	55.9	53.1	50.9	48.8	Fine Light NW breeze	External: Traffic (E Tamar) Rattle gun Grinder Saw TVPS: Tones BB noise LF rumble
Evening	15-May-19	21:50	53.9	74.3	52.2	55.0	54.4	53.7	53.0	52.7	Clear Calm	External: Traffic TVPS: Flow noise Tones LF rumble
Night	15-May-19	22:00	53.8	56.7	52.4	54.9	54.4	53.7	53.2	52.8	Clear Calm	External: Traffic TVPS: Flow noise Tones LF rumble

Table 5-4: Position 3 Ln-statistics.

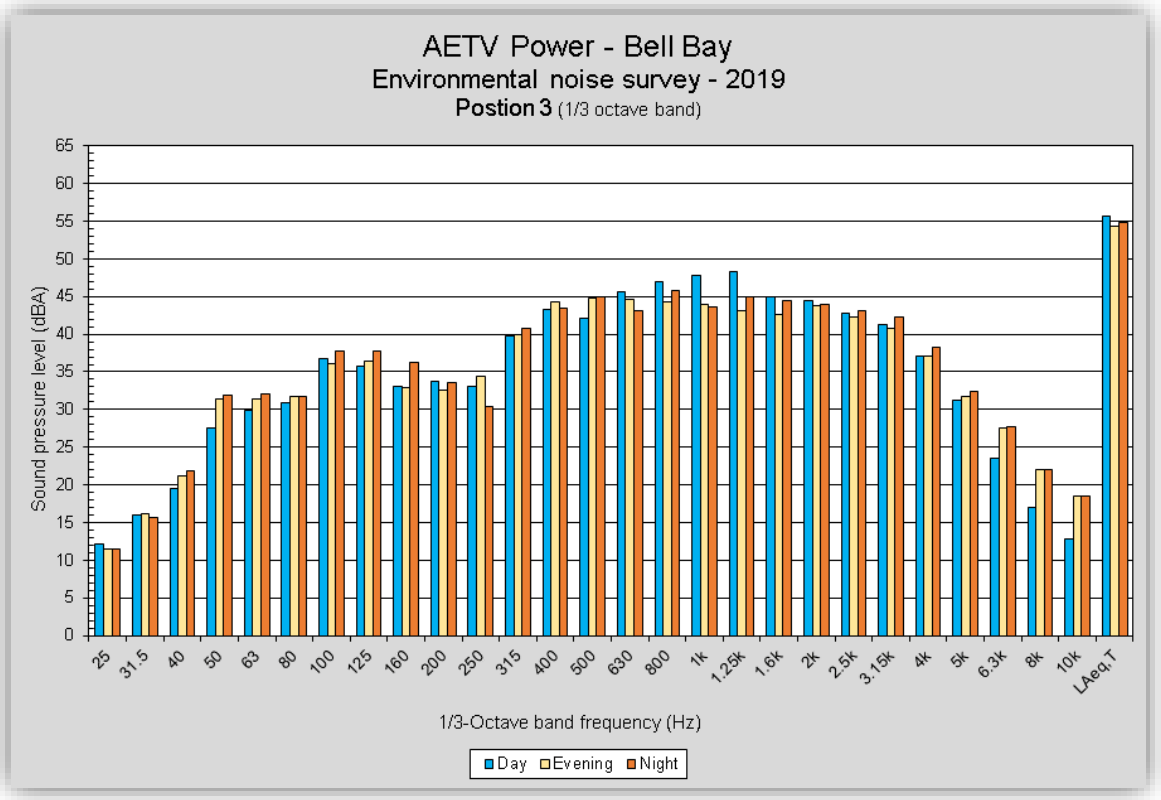


Figure 5-11: Position 3, 1/3-octave band spectrum.

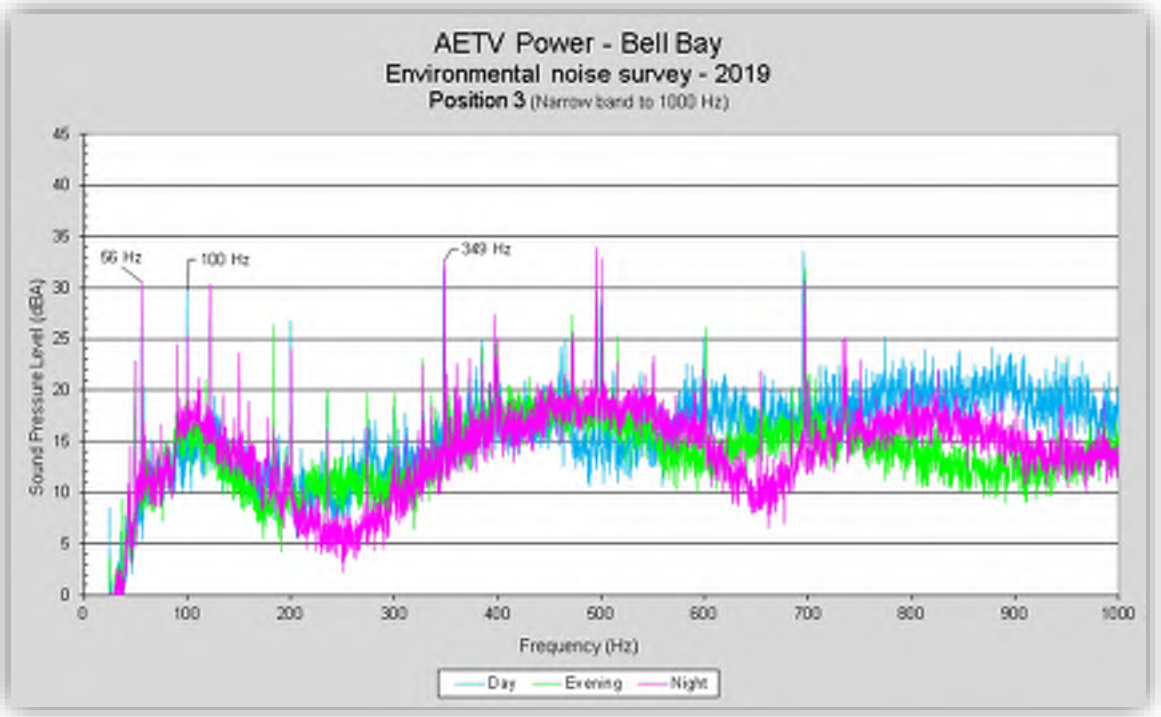


Figure 5-12: Position 3, narrow band spectrum 0 – 1000 Hz.

5.4 Position 4 – Brodies Rd

Position 4 is in Rowella approx.3.2 km south-west of the TVPS on the opposite bank of the Tamar River.

Day measurements were elevated by localised noise sources with a nearby domestic ploughing machine controlling the noise environment. During periods in the plougher's absence, fan tones from the Bell Bay industrial area became noticeable while the power station remained inaudible.

During the evening and night, the power station was faintly audible with emissions from the Bell Bay industrial area dominant. Local fauna and backing alarms from the Long Reach chipping plant were also audible during the night.

Figure 5-13: Position 4.

4 – Brodies Rd												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day*	15-May-19	15:48	39.8	57.2	28.4	49.5	41.3	35.5	31.3	29.8	Partly Cloudy Gentle W breeze	External: Traffic (Local) Birds & Cows Dog barking Bell bay fan tones Small ploughing machine Air gun
Evening	07-May-19	20:54	32.1	50.2	27.9	36.0	33.2	31.8	29.7	28.9	Mostly cloudy Light E air	External: Dog barking Birds + Fauna Impacts (Bell Bay) Aircraft Air gun TVPS: Cooling fans

Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	07-May-19	22:49	34.4	39.7	31.4	37.0	35.5	34.2	33.1	32.3	Partly cloudy Light SE breeze	External: Bell Bay fan tones Wagner BB-BA (Chipping mill) Frogs + Possums + Cows Aircraft TVPS: Cooling fans Transient LF roar

*First three intervals excluded due to elevated ambient noise from localised activity (additional fourth interval recorded)

Table 5-5: Position 4 Ln-statistics.

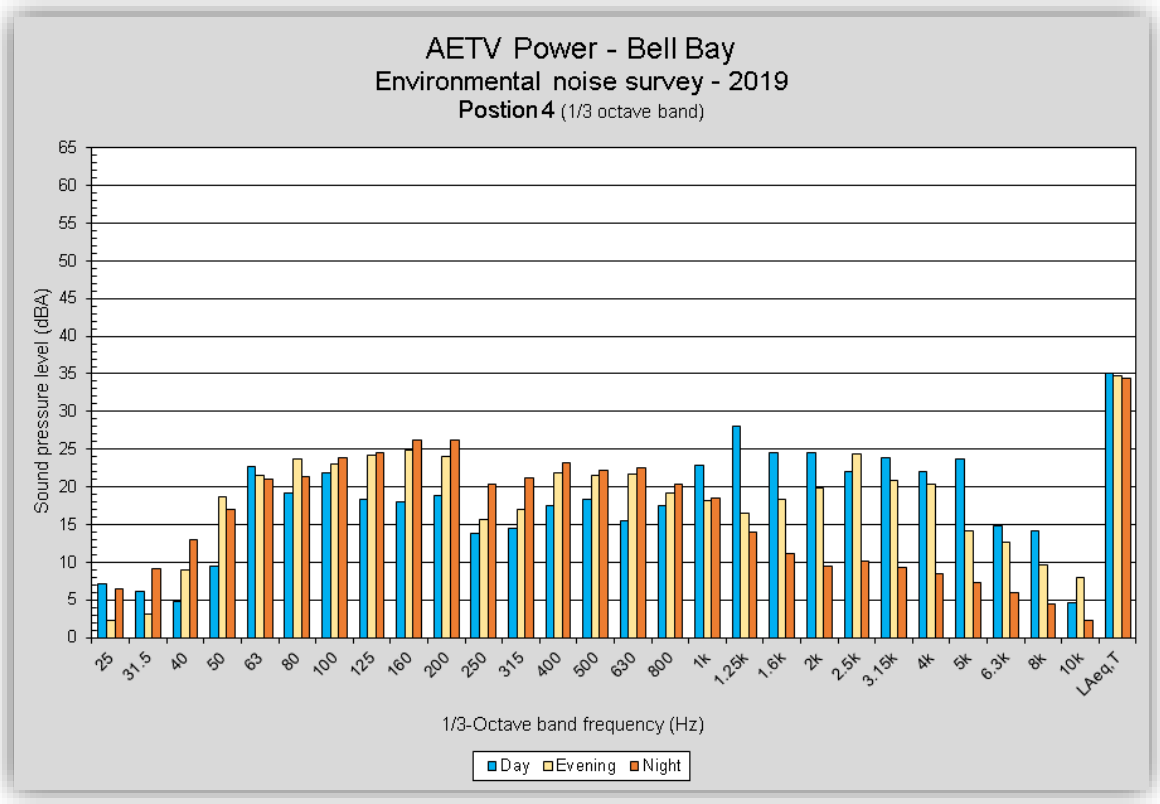


Figure 5-14: Position 4, 1/3-octave band spectrum.

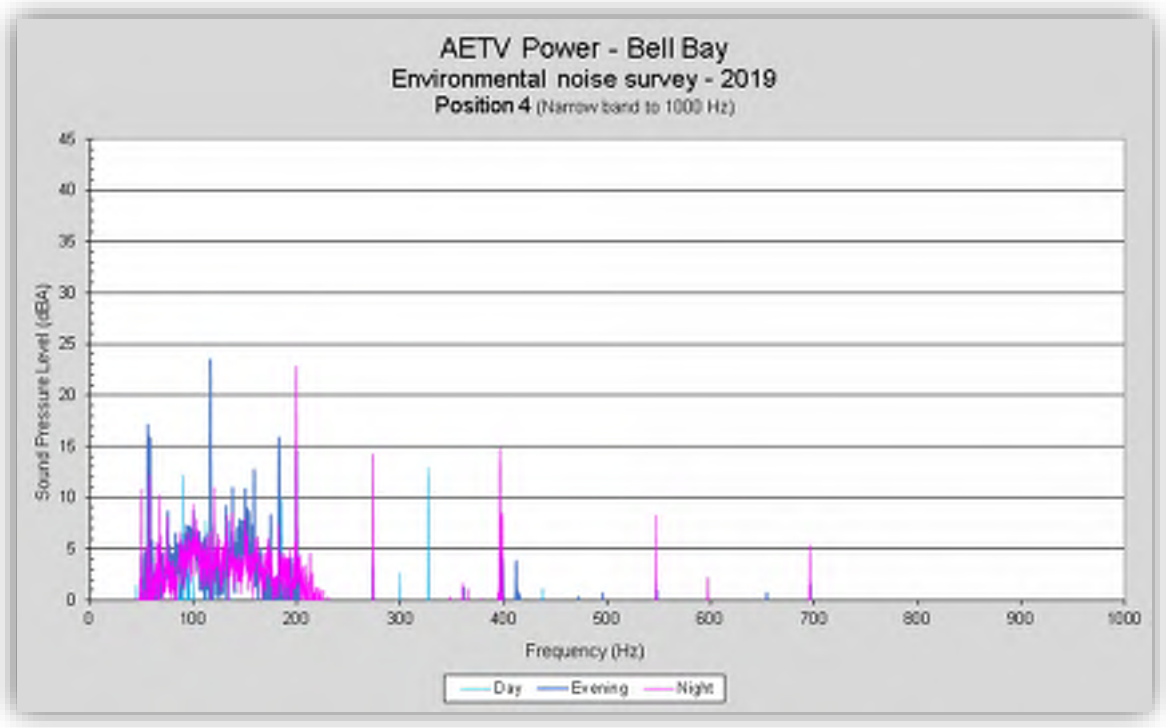


Figure 5-15: Position 4, narrow band spectrum 0 – 1000 Hz.

5.5 Position 5 – Wilmores Bluff

Position 5 was utilised as a permanent monitoring position during the survey and is the closest sensitive receiver in Rowella, approximately 2 km south of the power station.

During all three measurements the cooling tower fans from the TVPS were clearly audible with noise immission levels heavily dependent on prevailing wind conditions.

At night nearby, sheep passing through thick foliage was noticeable while fan tones from Bell Bay and the chipper at Long Reach were also audible.

During the evening and night, an occasional low frequency roar from the TVPS became audible for short periods.

Figure 5-16: Position 5 (Archive photo).

5 – Wilmores Bluff												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day	15-May-19	17:30	38.1	49.7	34.7	42.6	39.2	37.5	36.4	35.5	Partly cloudy Gentle W breeze	External: Birds + Sheep Moving foliage Insects Falling bark Bell bay fan tones TVPS: Cooling fans
Evening	07-May-19	20:00	38.0	45.9	34.5	42.1	39.3	37.6	36.2	35.3	Mostly cloudy Light NW breeze	External: Aircraft Birds + Sheep Moving foliage Livestock Bell bay roar TVPS Cooling fans Transient LF roar

Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	07-May-19	23:40	36.0	47.7	31.7	41.0	37.6	35.4	33.8	32.7	Partly cloudy Light SE breeze	External: Chip mill - Spiked tread dozer - Backing alarm - Engine brakes Birds + Sheep Moving foliage Bell bay fan tones TVPS Cooling fans Transient LF roar

Table 5-6: Position 5 Ln-statistics.

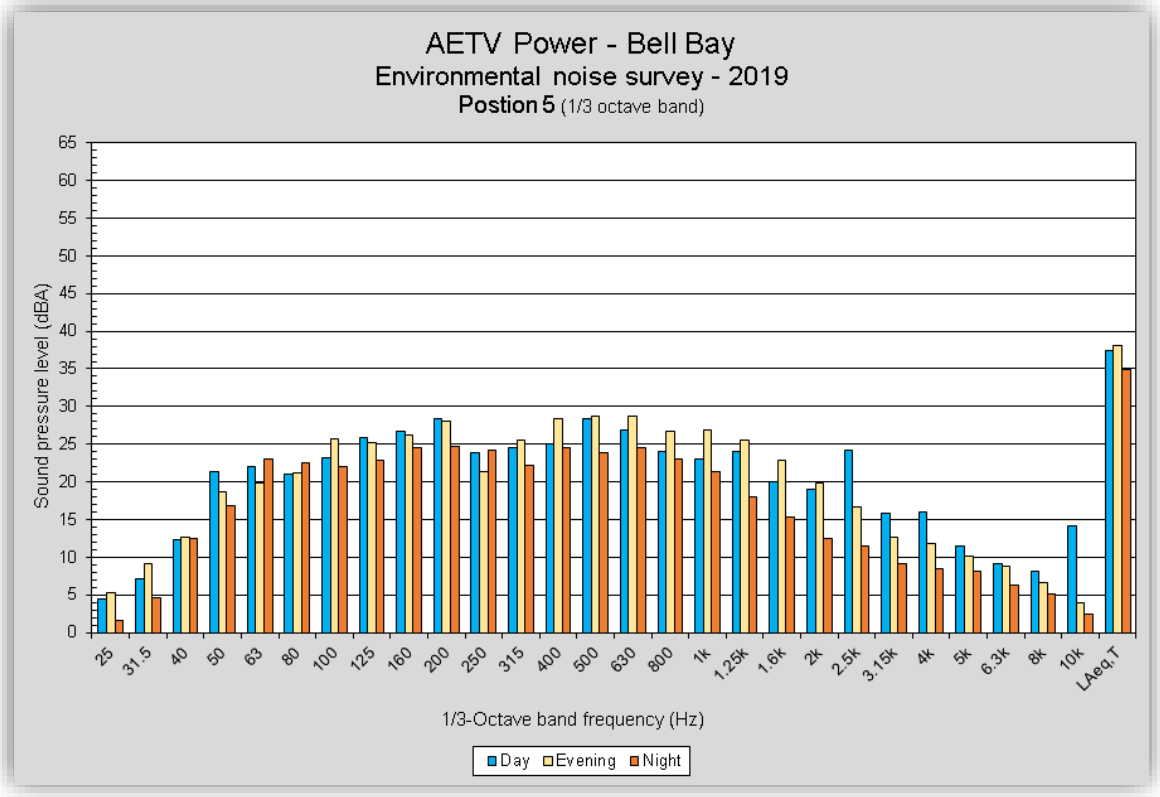


Figure 5-17: Position 5, 1/3-octave band spectrum.

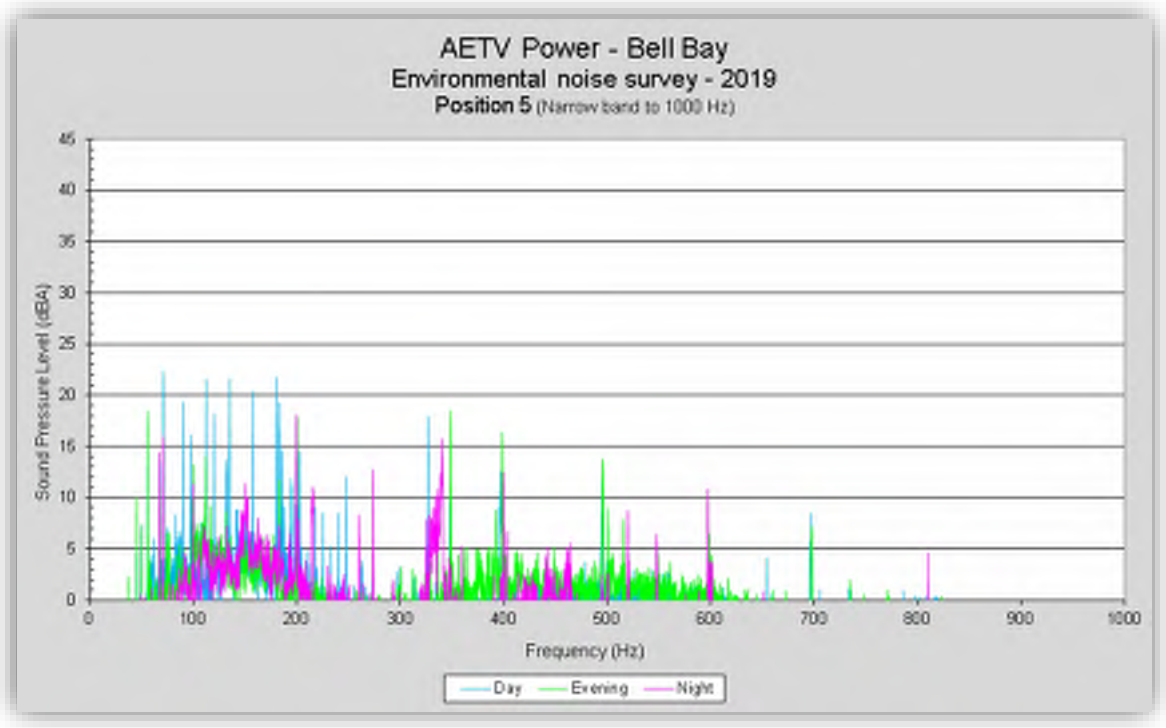


Figure 5-18: Position 5, narrow band spectrum 0 – 1000 Hz.

5.5.1 Position 5 – Wilmores Bluff during peaking plant operation

While the peaking plant was operating, a low frequency rumble and tones from the TVPS were audible along with emissions from the Long Reach chipper. Noise from the power station's cooling towers were also distinguishable as were the Wagner loader at the Long Reach mill and impacts from the Bell Bay industrial area.

5 – Wilmores Bluff (Peaking plant operation)												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	30-Apr-19	22:10	35.6	50.7	31.4	39.3	36.9	34.9	33.3	32.4	Overcast Light SSE breeze	External: Chip mill - Chipper - Wagner loader Traffic (E. Tamar) Bell Bay (Impacts) Insects + Fauna TVPS LF rumble LF tones BB flow noise

Table 5-7: Position 5 Ln-statistics during peaking plant operation.

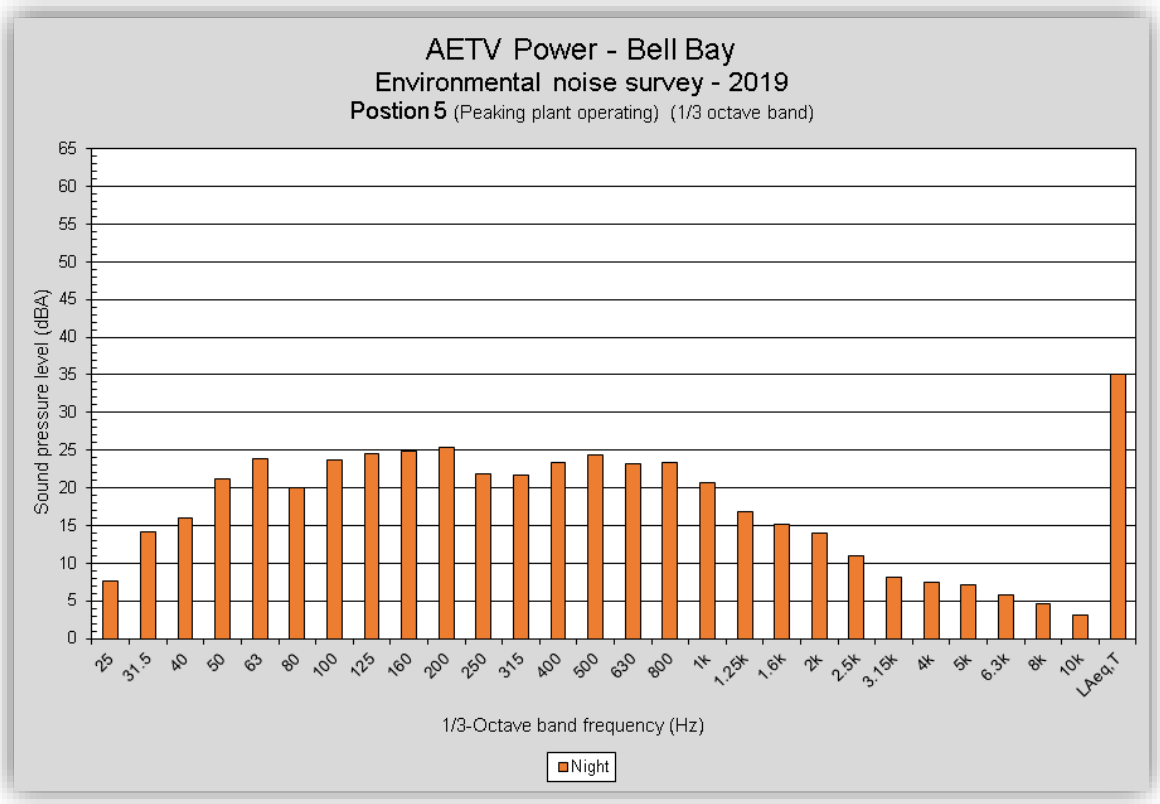


Figure 5-19: Position 5 during peaking plant operation, 1/3-octave band spectrum.

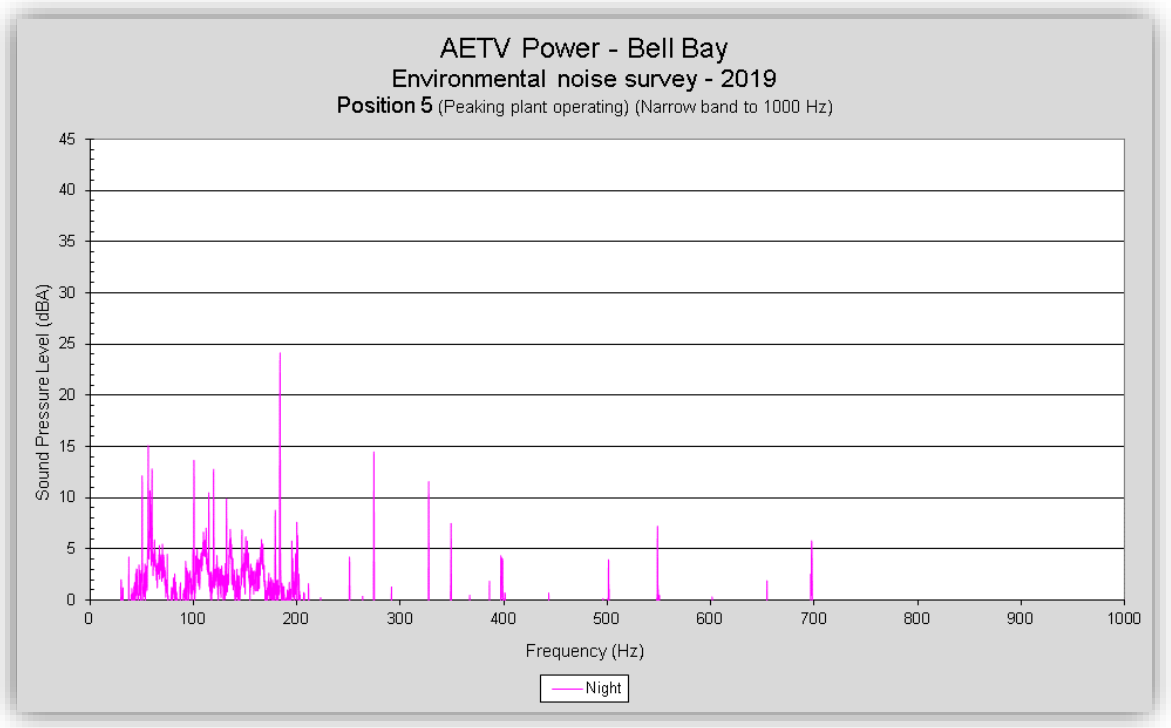


Figure 5-20: Position 5 during peaking plant operation, narrow band spectrum 0 – 1000 Hz.

5.6 Position 6 – Waterton Hall Rd

Position 6 is located at the eastern end of Rowella, approx. 4.4 km south south-east of the TVPS.

The noise environment during the day at this location was dominated by local noise sources including persistent chainsaw activity. In the absence of these sources, chipping operations at the Long Reach chip mill controlled background levels while the TVPS was inaudible.

During the evening and night cooling fans from the TVPS were faintly audible, however, activity from the Long Reach chip mill was dominant.

Figure 5-21: Position 6.

6 – Waterton Hall Rd												
Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Day*	15-May-19	16:42	41.9	58.2	29.6	51.1	45.4	38.3	33.4	31.4	Partly cloudy Gentle W breeze	External: Chainsaw Birds + Dogs Chipper Traffic (Rowella Rd.) Grazing cows Aircraft Air gun Insects + Sheep Voices (Brief)
Evening	07-May-19	21:33	31.4	48.4	27.0	36.5	33.0	30.6	29.0	27.9	Partly cloudy Light SE air	External: Wagner loader BB-BA Birds + Livestock Frogs + Possums Spiked tread dozer TVPS: Cooling fans

Period	Date	Time	LAeq	LAmax	LAmin	LA1	LA10	LA50	LA90	LA99	Weather	Audible sources
Night	07-May-19	22:03	34.6	47.9	30.3	39.3	36.2	33.8	32.3	31.2	Partly cloudy Light SE breeze	External: Chip mill: - Alarms - Spiked tread dozer - Wagner BB-BA Birds + Sheep + Local fauna Bell Bay hum TVPS: Cooling fans

* First interval excluded due to localised and prolonged chainsaw activity

Table 5-8: Position 6 Ln-statistics.

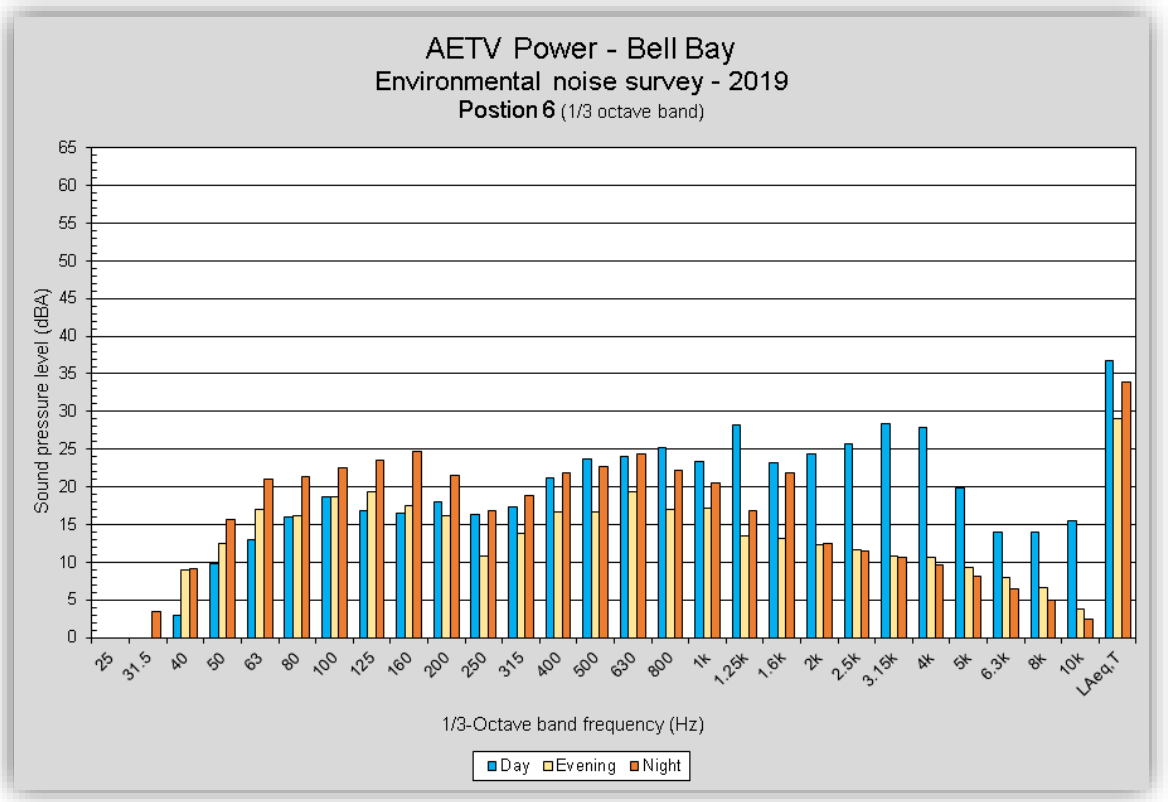


Figure 5-22: Position 6, 1/3-octave band spectrum.

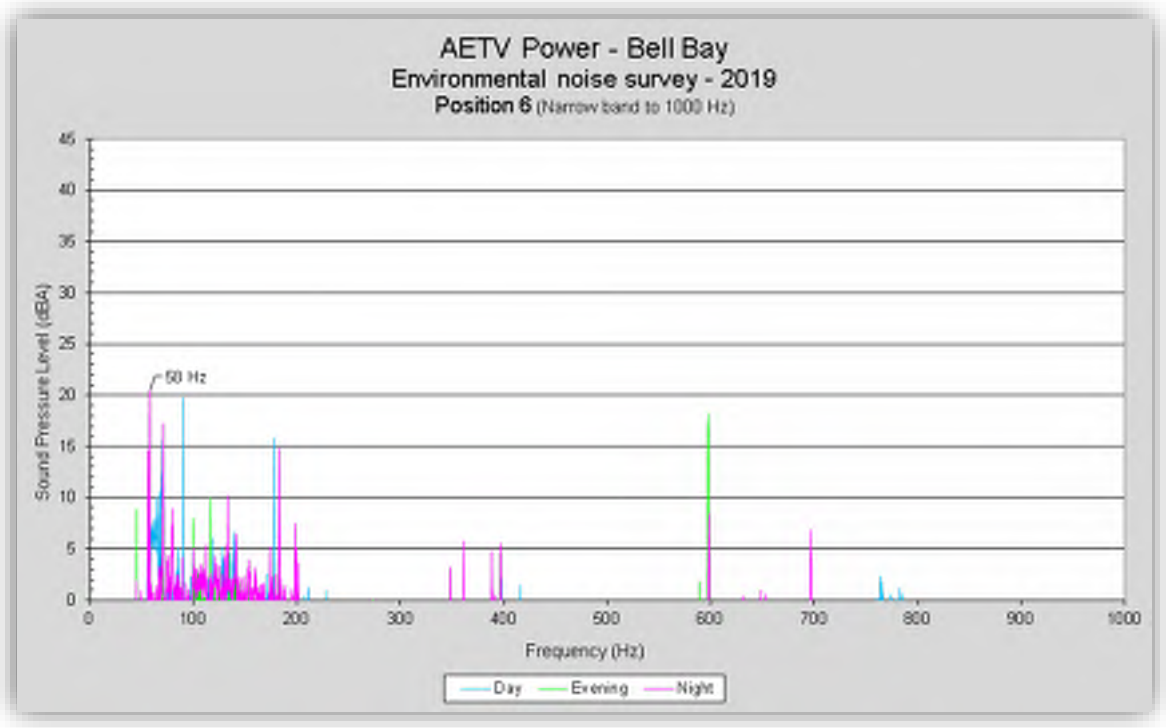


Figure 5-23: Position 6, narrow band spectrum 0 – 1000 Hz.

6 Discussion of results

Table 6-1 presents a summary of measured levels presented in section 5 of this report with assessment against the power station's EPN noise emission limits (applicable under condition N1 for sensitive noise areas A and B). Comments are also provided on the key features of the measured noise levels that relate to the assessment of potential breaches of the EPN limits. Measured levels that are potentially breaching these conditions are highlighted in pink.

Adjustments for impulsiveness and modulation were considered not relevant in this assessment. Tonal adjustments were applied where significant tones from the plant were identifiable while low frequency corrections were not required

Summary results								
Site	Period	Average $L_{Aeq,10min}$ (dBA)	Average $L_{A90,10min}$ (dBA)	Tonal Adj (dB)	$L_{Aeq,10min}$ Adj (dBA)	EPN Limit (dBA)	Potential Breach	Comment
1	Day	59.4	58.4	N/A	59.4	N/A	NO	Not a noise sensitive location
	Evening	60.2	59.6	N/A	60.2	N/A	NO	
	Night	59.8	59.2	N/A	59.8	N/A	NO	
2	Day	44.7	40.7	0.3	45	50	NO	TVPS audible. Noise emission limits not exceeded.
	Evening	43.2	39.1	0.7	43.9	50	NO	
	Night	45.3	43.6	1.3	46.6	50	NO	
	Night (Peaking)	47.1	45.8	2.6	49.7	50	NO	
3	Day	53.8	50.9	N/A	53.8	N/A	NO	Not a noise sensitive location
	Evening	53.9	53.0	N/A	53.9	N/A	NO	
	Night	53.8	53.2	N/A	53.8	N/A	NO	
4	Day	39.8	31.3	-	39.8	45	NO	TVPS not audible
	Evening	32.1	29.7	0.6	32.7	40	NO	TVPS audible. Noise emission limits not exceeded.
	Night	34.4	33.1	-	34.4	35	NO	TVPS faintly audible. Noise emission limits not exceeded.
5	Day	38.1	36.4	0.7	38.8	45	NO	TVPS audible. Noise emission limits not exceeded.
	Evening	38.0	36.2	0.5	38.5	40	NO	
	Night	36.0	33.8	0.3	36.3	38	NO	
	Night (Peaking)	35.6	33.3	0.4	36	38	NO	TVPS audible. Noise emission limit not exceeded.
6	Day	41.9	33.4	-	41.9	45	NO	TVPS not audible. Local sources dominant.
	Evening	31.4	29.0	-	31.4	40	NO	TVPS faintly audible. Noise emission limits not exceeded.
	Night	34.6	32.3	-	34.6	35	NO	

Potential breach of EPN noise emission limits.

Table 6-1: Summary table of survey results.

7 Conclusions

1. An environmental noise survey of the TVPS was conducted by Tarkarri Engineering between 30 April and 16 May 2019. All measurement were taken in accordance with the *Tasmanian Noise Measurement Procedures Manual* and measurement positions from previous surveys[1][2] were utilised.
2. Noise emission levels at sensitive receiver locations (receivers 2, 4, 5 and 6) didn't exceed the applicable noise emission limits for the power station.
3. The measured noise levels during CCGT operations were commensurate with levels measured at during previous surveys[1][2] while during peaking plant operations measured levels at positions 2 and 5 remained below EPN noise emission limit levels.
4. The results of the environmental noise survey of the TVPS demonstrate that the power station operations continue to not breach the EPN noise emission limits set out in condition N1.

Appendix A: Base load operation

Observed environmental noise data.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
1	Day	15-May-19	13:30	00:10:00.0	59.4	62.1	57.1	61.0	60.2	59.3	58.4	57.6
1	Evening	15-May-19	21:21	00:10:00.0	60.2	62.0	58.2	61.3	60.8	60.2	59.6	58.8
1	Night	15-May-19	23:00	00:10:00.0	59.8	61.5	58.5	60.7	60.3	59.7	59.2	58.9

Table A1 – Position 1 observed environmental noise measurements.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
2	Day	15-May-19	12:30	00:10:00.0	44.7	55.8	38.6	51.1	47.2	43.6	41.4	39.8
2	Day	15-May-19	12:40	00:10:00.0	44.7	56.6	37.5	52.6	47.4	42.8	40.1	38.6
2	Day	15-May-19	12:50	00:10:00.0	44.7	62.5	37.2	51.6	46.8	43.4	40.5	39.1
				Average	44.7	58.3	37.8	51.8	47.1	43.3	40.7	39.2
2	Evening	15-May-19	20:30	00:10:00.0	43.5	58.3	37.5	52.3	45.7	41.5	39.1	38.4
2	Evening	15-May-19	20:40	00:10:00.0	41.2	53.4	36.4	48.7	43.4	39.9	38.0	37.3
2	Evening	15-May-19	20:50	00:10:00.0	44.8	59.2	38.3	54.0	47.5	42.0	40.1	39.1
				Average	43.2	56.9	37.4	51.7	45.5	41.1	39.1	38.3
2	Night	15-May-19	23:40	00:10:00.0	46.2	53.7	43.7	50.7	47.6	45.7	44.8	44.2
2	Night	15-May-19	23:50	00:10:00.0	45.7	58.3	41.5	53.7	47.0	44.6	42.9	42.1
2	Night	16-May-19	00:00	00:10:00.0	44.0	48.5	41.5	45.9	44.9	43.9	43.0	42.1
				Average	45.3	53.5	42.2	50.1	46.5	44.7	43.6	42.8

Table A2 – Position 2 observed environmental noise measurements.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
3	Day	15-May-19	11:50	00:10:00.0	53.9	62.0	48.0	58.9	55.7	53.3	51.6	49.1
3	Day	15-May-19	12:00	00:10:00.0	54.7	63.0	48.7	61.0	57.1	53.5	51.4	49.7
3	Day	15-May-19	12:10	00:10:00.0	52.9	62.3	45.6	58.3	54.8	52.5	49.7	47.6
				Average	53.8	62.4	47.4	59.4	55.9	53.1	50.9	48.8
3	Evening	15-May-19	21:50	00:10:00.0	53.9	74.3	52.2	55.0	54.4	53.7	53.0	52.7
3	Night	15-May-19	22:00	00:10:00.0	54.2	55.8	52.7	55.4	54.8	54.1	53.5	53.2
3	Night	15-May-19	22:10	00:10:00.0	53.7	58.2	52.2	54.7	54.2	53.6	53.1	52.6
3	Night	15-May-19	22:20	00:10:00.0	53.5	56.1	52.2	54.7	54.1	53.5	53.0	52.6
				Average	53.8	56.7	52.4	54.9	54.4	53.7	53.2	52.8

Table A3 – Position 3 observed environmental noise measurements.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
4	Day*	15-May-19	15:48	00:10:00.0	43.6	63.8	29.5	58.3	40.1	34.9	32.2	30.8
4	Day*	15-May-19	15:58	00:10:00.0	41.9	54.6	30.0	49.9	46.4	37.7	33.0	31.6
4	Day*	15-May-19	16:08	00:10:00.0	40.9	54.4	27.7	50.6	44.0	38.2	30.8	29.1
4	Day	15-May-19	16:18	00:10:00.0	33.0	56.0	26.5	39.3	34.5	31.2	29.1	27.7
				Average	33.0	56.0	26.5	39.3	34.5	31.2	29.1	27.7
* The first three measurements are excluded due to elevated ambient noise.												
4	Evening	07-May-19	20:54	00:10:00.0	30.8	50.6	26.2	36.7	31.7	30.2	27.8	27.1
4	Evening	07-May-19	21:04	00:10:00.0	32.4	51.6	28.4	35.3	33.5	32.2	30.3	29.4
4	Evening	07-May-19	21:14	00:10:00.0	33.2	48.5	29.2	35.9	34.5	33.0	31.0	30.2
				Average	32.1	50.2	27.9	36.0	33.2	31.8	29.7	28.9
4	Night	07-May-19	22:49	00:10:00.0	34.3	38.2	31.8	36.8	35.4	34.1	33.3	32.6
4	Night	07-May-19	22:59	00:10:00.0	34.5	39.3	31.2	36.9	35.7	34.3	33.1	32.3
4	Night	07-May-19	23:09	00:10:00.0	34.3	41.7	31.1	37.2	35.5	34.2	32.8	32.0
				Average	34.4	39.7	31.4	37.0	35.5	34.2	33.1	32.3

Table A4 – Position 4 observed environmental noise measurements.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
5	Day	15-May-19	17:30	00:10:00.0	38.6	58.6	34.8	45.0	39.2	37.6	36.7	35.8
5	Day	15-May-19	17:40	00:10:00.0	37.8	46.6	34.9	41.4	38.9	37.5	36.5	35.7
5	Day	15-May-19	17:50	00:10:00.0	37.8	44.1	34.2	41.3	39.4	37.3	36.1	35.0
				Average	38.1	49.7	34.7	42.6	39.2	37.5	36.4	35.5
5	Evening	07-May-19	20:00	00:10:00.0	38.7	48.2	33.7	43.2	40.5	38.2	36.5	35.0
5	Evening	07-May-19	20:10	00:10:00.0	37.9	44.6	34.7	42.2	38.9	37.6	36.4	35.4
5	Evening	07-May-19	20:20	00:10:00.0	36.6	42.7	34.4	38.5	37.7	36.4	35.3	34.8
5	Evening	07-May-19	20:30	00:10:00.0	38.9	48.1	35.1	44.5	40.2	38.3	36.6	35.8
				Average	38.0	45.9	34.5	42.1	39.3	37.6	36.2	35.3
5	Night	07-May-19	23:40	00:10:00.0	36.3	48.3	31.5	42.7	38.0	35.5	33.6	32.6
5	Night	07-May-19	23:50	00:10:00.0	35.8	41.1	32.0	38.2	37.0	35.6	34.1	33.2
5	Night	08-May-19	00:00	00:10:00.0	36.1	53.7	31.5	42.2	37.8	35.2	33.8	32.3
				Average	36.0	47.7	31.7	41.0	37.6	35.4	33.8	32.7

Table A5 – Position 5 observed environmental noise measurements.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
6	Day*	15-May-19	16:42	00:10:00.0	45.0	66.9	28.8	53.4	47.4	41.7	34.2	31.5
6	Day	15-May-19	16:52	00:10:00.0	42.8	60.2	28.7	53.1	45.9	38.3	33.0	30.7
6	Day	15-May-19	17:02	00:10:00.0	41.1	56.1	30.5	49.1	44.8	38.2	33.8	32.0
				Average	41.9	58.2	29.6	51.1	45.4	38.3	33.4	31.4
*First interval excluded due to localised and prolonged chainsaw activity												
6	Evening	07-May-19	21:33	00:10:00.0	31.5	50.6	27.8	37.7	32.8	30.5	29.3	28.4
6	Evening	07-May-19	21:43	00:10:00.0	30.2	44.8	26.1	34.8	31.7	29.6	28.1	27.1
6	Evening	07-May-19	21:53	00:10:00.0	32.5	49.8	27.1	37.0	34.6	31.6	29.7	28.2
				Average	31.4	48.4	27.0	36.5	33.0	30.6	29.0	27.9
6	Night	07-May-19	22:03	00:10:00.0	32.3	47.6	28.4	35.4	34.0	31.9	30.4	29.3
6	Night	07-May-19	22:13	00:10:00.0	34.7	49.4	30.1	42.1	36.7	33.3	31.9	31.1
6	Night	07-May-19	22:23	00:10:00.0	36.6	46.8	32.3	40.5	38.0	36.1	34.5	33.3
				Average	34.6	47.9	30.3	39.3	36.2	33.8	32.3	31.2

Table A6 – Position 6 observed environmental noise measurements.

Appendix B: Peaking plant operation

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
2	Night	30-Apr-19	23:19	00:10:00.0	46.9	50.0	44.4	48.9	47.7	46.8	45.8	45.0
2	Night	30-Apr-19	23:29	00:10:00.0	47.3	52.7	44.6	51.2	48.8	47.0	45.7	45.2
2	Night	30-Apr-19	23:39	00:10:00.0	47.2	54.4	44.5	50.7	48.3	47.0	45.8	45.2
				Average	47.1	52.4	44.5	50.3	48.3	46.9	45.8	45.1
2A	Night	30-Apr-19	23:53	00:10:00.0	46.7	54.6	43.5	50.9	48.2	46.0	44.9	44.2

Table B1 – Position 2 observed environmental noise measurements during peaking plant operation.

Position	Period	Date	Time	Duration	$L_{Aeq,10min}$	$L_{Amax,10min}$	$L_{Amin,10min}$	$L_{A1,10min}$	$L_{A10,10min}$	$L_{A50,10min}$	$L_{A90,10min}$	$L_{A99,10min}$
5	Night	30-Apr-19	22:10	00:10:00.0	34.1	59.7	29.0	39.1	35.1	32.8	31.1	30.2
5	Night	30-Apr-19	22:20	00:10:00.0	36.2	47.2	32.8	39.4	37.8	35.9	34.4	33.7
5	Night	30-Apr-19	22:30	00:10:00.0	36.4	45.3	32.3	39.4	37.9	36.1	34.5	33.3
				Average	35.6	50.7	31.4	39.3	36.9	34.9	33.3	32.4

Table B2 – Position 5 observed environmental noise measurements during peaking plant operation.

APPENDIX G1

Supporting information for free chlorine in-house testing 2019/20

TVPS Employee Free Chlorine Training (2019/20 AER reporting period)

Employee Name	Training Course	Completed Date	Renewal Date	Trainer Name	Training ID
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	12/06/2012	11/06/2013	Kathy Shanley	ET2371
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	18/06/2013	17/06/2014	Kathy Shanley	ET2372
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	11/06/2014	9/06/2015	Kathy Shanley	ET2373
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	11/06/2015	7/06/2016	Kathy Shanley	ET2374
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	7/06/2016	6/06/2017	Kathy Shanley	ET2375
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	14/06/2017	5/06/2018	Kathy Shanley	ET2376
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	6/06/2018	4/06/2019	Kathy Shanley	ET2377
Philip Felmingham	Free Chlorine Method Training Chemical Training : In House : TVPS	4/06/2019	2/06/2020	Kathy Shanley	ET2378
Erik McKitrick	Free Chlorine Method Training Chemical Training : In House : TVPS	6/06/2018	4/06/2019	Kathy Shanley	ET2379
Rohan Hirst	Free Chlorine Method Training Chemical Training : In House : TVPS	4/12/2019	4/12/2020	Kathy Shanley	ET2415
Ian Schwanck	Free Chlorine Method Training Chemical Training : In House : TVPS	16/01/2020	16/01/2021	Kathy Shanley	ET2416
Brett Mills	Free Chlorine Method Training Chemical Training : In House : TVPS	16/01/2020	16/01/2021	Kathy Shanley	ET2417
Matt Simmons	Free Chlorine Method Training Chemical Training : In House : TVPS	23/01/2020	23/01/2021	Kathy Shanley	ET2418

Hach Spectrophotometer Maintenance & Verification Report

Imbros Pty Ltd
ABN 29 009 525 053
1059 Cambridge Road
Cambridge Tasmania 7170

Phone (03) 6216 1500
Fax (03) 6216 1555
info@imbros.com.au

Company:	TasWater	**Service Date:**	22nd Jan 2020
Site Address:	AETV Power Pty Ltd 4055 East Tamar Highway, George Town, TAS 7253	**Technician:** **Next Service Due:**	Marin Gotthard Jan 2021
Customer Contact:	Kathy Shanley	**Customer Work Order:**	4410047680
Contact Number:	0408 841 819		
Contact Email:	kathy.shanley@hydro.com.au	**Imbros Sales Order:**	1121050

Brand	**Model / Product ID**		**Serial Number**
HACH	DR6000 [LPV441.99.00012]		1617034
Asset Location:	Treatment Plant Laboratory	**Customer Asset ID:**	N/A

OPERATIONAL, PERFORMANCE, SERVICE CONDITION OF INSTRUMENT			
Touch Screen clean/test:	***Cleaned and passed***	**RFID & Barcode detection:**	***Checked and passed***
Inspect / Clean Optics:	***See Noise Check***	**Firmware Version:**	v1.18 **[updated to v1.19]**
Int. Clock & Service Date:	***Set***	**Lamp (Measurements / Hours):**	***VIS: 7.3 / UV: 0.1 Hours***

PRIMARY OPTICAL CHECKS						
TEST FILTER SET & RESULTS	**Kit Identification** Hach LZV537		**Lot No / Set ID** 3341		**Valid Until** 29th Feb 2020	
	Filter	**Wavelength**	**Nominal Value**	**Tolerance**	**Actual Value**	**OUTCOME**
Stray Light	KV450/3	340nm	>2.8 Abs	---	*3.903 Abs*	**[PASS]**
Photometric Accuracy	NG9/1	546nm	1.462 Abs	±3%	*1.462 Abs*	**[PASS]**
	NG5/2	546nm	0.614 Abs	±3%	*0.614 Abs*	**[PASS]**
	NG11/2	546nm	0.317 Abs	±3%	*0.313 Abs*	**[PASS]**
Wavelength Accuracy	Ho	359 – 363nm	360.9 nm	±1.5nm	*361.2 nm*	**[PASS]**
	BG20/2	805 – 809nm	807.0 nm	±1.5nm	*807.6 nm*	**[PASS]**
Optical Noise (DR6000 only)	Visible	807nm	Sample 23.237 ±0.0980nA		Ref 1.5153 ±0.0041nA	
	UV	254nm	Sample 27.381 ±0.1790nA		Ref 2.3047 ±0.0061nA	

SECONDARY VERIFICATION CHECKS				
SECONDARY STD SET & RESULTS	**Kit Identification** HACH 2712500	**Lot No / Set ID** A7159	**Valid Until** Jun 2019	
	Blank	**STD 1 (mg/L)**	**STD 2 (mg/L)**	**STD 3 (mg/L)**
Nominal Value	0.00 mg/L	0.39 ± 0.10 mg/L	1.05 ± 0.15 mg/L	1.64 ± 0.20 mg/L
Actual Value	*0.00 mg/L*	*0.39mg/L*	*1.05 mg/L*	*1.63 mg/L*
OUTCOME	**[PASS]**	**[PASS]**	**[PASS]**	**[PASS]**

GENERAL COMMENTS

Firmware was updated from v1.18 to v1.19. The Stray Light, Photometric Accuracy and Wavelength Accuracy were verified using the primary test filter kit. All values are within tolerances. The wavelength accuracy is slightly out, but is consistent with since last service and is <1.5nm. A Noise check was performed for long term monitoring (no formal pass/fail spec exists for this); sample absorbance is slightly high, possibly indicating some dust on a lens or mirror in this beam path. Monitor this. The unit is in Good working order.

Technician: MARTIN GOTTHARD

WTP Operational Sample Checks (2019/20 AER reporting period)

Date	Time	Sample location	Sample Type	Reading	Name
3/04/2019	1:30:00 PM	Cooling tower	F/C	1.62	PF
12/04/2019	9:10:00 AM	Cooling tower	pH	7.02	PF
12/04/2019	9:10:00 AM	Cooling tower	F/C	0.25	PF
16/04/2019	9:00:00 AM	Cooling tower	F/C	0.09	PF
16/04/2019	9:00:00 AM	Cooling tower	pH	7.30	PF
16/04/2019	9:00:00 AM	Cooling tower	chlorides	175.00	PF
21/08/2019	10:50:00 AM	Raw water	F/C	0.49	PF
21/08/2019	11:00:00 AM	Outfall	F/C	0.04	PF
21/08/2019	11:15:00 AM	Pond	F/C	0.03	PF
17/10/2019	3:10:00 PM	Pond	F/C	0.10	PF
21/10/2019	9:10:00 AM	Pond	F/C	0.03	PF
21/10/2019	9:10:00 AM	Pond	pH	7.01	PF
21/10/2019	9:10:00 AM	Pond	DO	95.20	PF
29/10/2019	2:40:00 PM	Pond	f/c	0.02	KS
29/10/2019	2:40:00 PM	Pond	PH	7.25	KS
29/10/2019	2:40:00 PM	Pond	DO	105.50	KS
5/11/2019	9:30:00 AM	Pond	F/C	0.03	KS
5/11/2019	9:30:00 AM	Pond	pH	8.17	KS
5/11/2019	9:30:00 AM	Pond	DO	103.00	KS
12/11/2019	9:10:00 AM	Outfall	F/C	0.02	KS
21/11/2019	12:15:00 PM	Cooling tower	F/C	1.47	KS
26/11/2019	12:10:00 PM	Cooling tower	F/C	0.01	KS
26/11/2019	12:10:00 PM	Pond	F/C	0.01	KS
2/12/2019	2:00:00 PM	Pond	F/C	0.01	KS
3/12/2019	10:00:00 AM	Pond	F/C	0.02	KS
3/12/2019	10:00:00 AM	Pond	DO	97.90	KS
30/12/2019	11:30:00 AM	Cooling tower	F/C	5.00	KS
3/01/2020	8:30:00 AM	Cooling tower	F/C	1.11	KS
6/01/2020	10:30:00 AM	Cooling tower	F/C	0.11	KS
6/01/2020	10:30:00 AM	Cooling tower	F/C	0.04	KS
6/01/2020	11:45:00 AM	Cooling tower	F/C	5.00	KS
9/01/2020	8:15:00 AM	Pond	F/C	0.04	PF
9/01/2020	8:15:00 AM	Pond	DO	96.00	PF
9/01/2020	8:15:00 AM	Pond	PH	7.07	PF
13/01/2020	1:00:00 PM	Cooling tower	F/C	1.45	PF
13/01/2020	1:00:00 PM	Cooling tower	F/C	1.50	PF
16/01/2020	8:35:00 AM	Pond	F/C	0.03	PF
16/01/2020	1:40:00 PM	Cooling tower	F/C	4.00	PF
20/01/2020	8:10:00 AM	Cooling tower	F/C	1.08	PF
20/01/2020	8:11:00 AM	Cooling tower	F/C	1.08	PF
20/01/2020	8:45:00 AM	Pond	F/C	0.04	PF
20/01/2020	1:10:00 PM	Cooling tower	F/C	1.40	PF
23/01/2020	10:29:00 AM	Cooling tower	F/C	0.71	PF
24/01/2020	8:20:00 AM	Pond	pH	7.59	PF
24/01/2020	8:20:00 AM	Pond	F/C	4.70	PF
24/01/2020	8:20:00 AM	Pond	DO	108.10	PF
24/01/2020	8:25:00 AM	Cooling tower	F/C	7.20	PF

Date	Time	Sample location	Sample Type	Reading	Name
24/01/2020	8:25:00 AM	Cooling tower	F/C	3.62	PF
24/01/2020	8:25:00 AM	Cooling tower	F/C	3.62	PF
28/01/2020	12:00:00 PM	Pond	F/C	0.02	PF
28/01/2020	12:00:00 PM	Cooling tower	F/C	0.86	PF
28/01/2020	12:00:00 PM	Cooling tower	F/C	0.72	PF
3/02/2020	1:35:00 PM	Pond	F/C	0.02	PF
4/02/2020	8:15:00 AM	Pond	F/C	0.02	PF
4/02/2020	8:15:00 AM	Pond	pH	7.13	PF
6/02/2020	12:00:00 PM	Cooling tower	F/C	1.41	PF
6/02/2020	12:00:00 PM	Cooling tower	F/C	1.41	PF
6/02/2020	1:20:00 PM	Cooling tower	F/C	1.40	PF
11/02/2020	11:00:00 AM	Outfall	F/C	0.04	PF
11/02/2020	11:00:00 AM	Outfall	pH	7.38	PF
11/02/2020	11:00:00 AM	Outfall	DO	90.10	PF
13/02/2020	9:30:00 AM	Cooling tower	F/C	0.06	PF
13/02/2020	10:30:00 AM	Closed cooling water	Cy	1011.00	PF
13/02/2020	10:30:00 AM	Cooling tower	F/C	3.01	PF
17/02/2020	1:00:00 PM	Pond	F/C	0.03	PF
18/02/2020	8:35:00 AM	Cooling tower	F/C	0.57	PF
18/02/2020	10:15:00 AM	Cooling tower	F/C	2.50	PF
20/02/2020	12:15:00 PM	Cooling tower	F/C	0.30	PF
20/02/2020	1:12:00 PM	Cooling tower	F/C	0.91	PF
28/02/2020	8:05:00 AM	Pond	F/C	0.02	PF
3/03/2020	11:05:00 AM	Cooling tower	F/C	0.04	PF
3/03/2020	11:45:00 AM	Cooling tower	F/C	0.84	PF
3/03/2020	1:30:00 PM	Cooling tower	F/C	1.60	PF
4/03/2020	3:04:00 PM	Cooling tower	F/C	1.00	PF
12/03/2020	11:35:00 AM	Cooling tower	F/C	0.11	PF
12/03/2020	12:16:00 PM	Cooling tower	F/C	0.83	PF
17/03/2020	10:48:00 AM	Pond	F/C	0.04	PF
20/03/2020	7:12:00 AM	Cooling tower	F/C	0.06	PF
20/03/2020	7:12:00 AM	Cooling tower	F/C	1.00	PF
25/03/2020	7:12:00 AM	Cooling tower	F/C	0.15	PF
25/03/2020	6:00:00 AM	Cooling tower	F/C	1.11	PF
30/03/2020	9:36:00 AM	Pond	F/C	0.03	PF
31/03/2020	1:12:00 AM	Cooling tower	F/C	0.11	PF

TVPS Outfall Free Chlorine Chemical Readings (2019/20 AER reporting period)

DATE	Time of sample	RAW WATER (before dosing)	COOLING TOWER BASIN	Waste Water Retention Pond	Outfall to river			Name of Tester	Comments
		Free Chlorine	Free Chlorine	Free Chlorine	Free Chlorine	Dissolved O_2	pH		
3/04/2019	9.45 AM	0	0.05	0.05	0.03	98.2	98.8	PF	curries
28/05/2019	10.15 AM			0.08	0.06	96.1	8.27	PF	chimney
19/06/2019	11.10 AM			0.12	0.09	98.9	7.05	PF	chimney
25/07/2019	11.05 AM		Empty	0.09	0.05	86.8	7.8	PF	chimney
21/08/2019	11.30 AM	0.49	Empty	0.03	0.04	98.6	7.5	PF	chimney
September			Empty					PF	No sample,site shut down,maintenance outage,chimney
29/10/2019	2:40:00 PM		Empty	0.03	0.02	105.5	7.25	KS	201 off, chimney
12/11/2019	9:10:00 AM		Empty	0.03	0.02	85	7.28	KS	202 off,chimney
13/01/2020	11.30 AM	0	Empty	0.05	0.03	97.7	8.27	PF	201 off, curries
11/02/2020	1:45:00 PM	0	0.04	0.03	0.02	97.7	7.25	PF	202 off, curries
18/03/2020	11.40 AM	0	0.06	0.04	0.01	94.5	8.1	PF	203 off, curries
14/04/2020	10.20 Am	0	0.1	0.06	0.02	97.5	7.01	PF	204 off, curries
13/05/2020	11.15 AM	0	0.19	0.04	0.02	98.7	8.15	PF	205 off, curries
2/6/32020	3:15:00 PM	0.33	0.02	0.04	0.02	94.2	7.25	PF	201 off, chimney saddle

APPENDIX G2

Wastewater outfall inline daily average results 2019/20

Summary of Wastewater Outfall Inline Daily Average Results

Period: 1st April 2019 to 31st March 2020

	GMC01CT701	GMC01CF701	GMC01CQ701B	GMC01CQ701A	11PAD01CF001		
DATE TIME	**WASTE WATER OUTFALL TEMP °C**	**WASTE WATER OUTFALL FLOW (m³/hr)**	**WASTE WATER OUTFALL PH**	**WASTE WATER OUTFALL DISOLVED OXYGEN (%)**	**COOLING TOWER BLOWDOWN m³/hr**	**WATER SUPPLY**	**OPERATIONAL COMMENTS / ISSUES**
1/04/2019	16.84	12.30	7.67	104.69	0.00	Curries River	Unit 201 Dry Layup ↓ Cooling Tower remained in service, circulating weekly to maintain free chlorine in the system
2/04/2019	16.87	7.03	7.61	105.89	0.00	Curries River	
3/04/2019	16.53	24.18	7.65	105.04	0.00	Curries River	
4/04/2019	15.46	5.64	7.65	105.27	0.00	Curries River	
5/04/2019	15.74	8.23	7.72	106.45	0.00	Curries River	
6/04/2019	16.87	12.23	7.72	107.42	0.00	Curries River	
7/04/2019	16.57	15.81	7.70	105.08	0.00	Curries River	
8/04/2019	15.65	14.35	7.73	103.10	0.00	Curries River	
9/04/2019	15.04	15.34	7.69	101.22	0.00	Curries River	
10/04/2019	14.88	14.39	7.61	102.29	0.00	Curries River	
11/04/2019	14.89	16.44	7.63	102.84	0.00	Curries River	
12/04/2019	14.85	16.12	7.57	102.78	0.00	Curries River	
13/04/2019	15.64	16.22	7.52	103.84	0.00	Curries River	
14/04/2019	15.81	10.49	7.56	105.29	0.00	Curries River	
15/04/2019	15.71	13.70	7.61	105.67	0.00	Curries River	
16/04/2019	16.53	18.55	7.60	105.32	0.00	Curries River	
17/04/2019	17.03	30.22	7.58	105.46	0.00	Curries River	201 online
18/04/2019	16.49	38.71	7.69	103.37	1.77	Curries River	201 online
19/04/2019	17.47	108.48	7.79	103.56	25.38	Curries River	201 online
20/04/2019	19.14	183.81	7.81	103.77	26.60	Curries River	201 online
21/04/2019	20.70	88.36	7.80	104.04	24.61	Curries River	201 online
22/04/2019	19.81	77.05	7.85	103.29	22.62	Curries River	201 online
23/04/2019	19.06	74.84	7.76	103.29	23.97	Curries River	201 online
24/04/2019	19.12	74.98	7.77	103.47	22.89	Curries River	201 online
25/04/2019	18.29	73.43	7.87	102.36	22.16	Curries River	201 online
26/04/2019	17.01	73.07	7.80	101.22	21.14	Curries River	201 online
27/04/2019	16.26	72.76	7.85	101.81	22.49	Curries River	201 online
28/04/2019	17.19	74.87	7.87	102.72	23.25	Curries River	201 online
29/04/2019	17.49	75.30	7.84	103.21	22.84	Curries River	201 online
30/04/2019	18.17	75.33	7.87	103.59	23.32	Curries River	201 online
1/05/2019	18.08	76.19	7.88	103.61	23.34	Curries River	201 online
2/05/2019	18.79	78.65	7.88	104.17	22.62	Curries River	201 online
3/05/2019	18.46	78.86	7.82	103.78	22.28	Curries River	201 online
4/05/2019	17.76	75.93	7.82	103.24	22.86	Curries River	201 online
5/05/2019	17.27	76.25	7.84	103.88	22.04	Curries River	201 online
6/05/2019	16.54	76.25	7.87	103.87	22.72	Curries River	201 online
7/05/2019	16.45	73.66	7.81	103.67	23.43	Curries River	201 online
8/05/2019	17.02	76.52	7.85	104.08	23.76	Curries River	201 online
9/05/2019	16.62	73.75	7.94	103.77	22.72	Curries River	201 online
10/05/2019	16.73	78.70	7.92	104.27	29.14	Curries River	201 online
11/05/2019	16.58	75.86	7.86	104.74	30.03	Curries River	201 online
12/05/2019	17.22	77.09	7.87	105.51	24.47	Curries River	201 online
13/05/2019	17.31	63.78	7.86	105.51	24.65	Chimney Saddle	201 online
14/05/2019	18.59	38.89	7.67	104.52	23.91	Chimney Saddle	201 online
15/05/2019	19.31	36.58	7.65	104.27	24.83	Chimney Saddle	201 online
16/05/2019	20.49	36.87	7.62	104.79	25.38	Chimney Saddle	201 online
17/05/2019	20.63	35.84	7.58	105.16	24.29	Chimney Saddle	201 online
18/05/2019	20.23	36.98	7.54	105.78	25.16	Chimney Saddle	201 online
19/05/2019	19.68	38.89	7.50	106.57	25.54	Chimney Saddle	Unit 201 Dry Layup ↓
20/05/2019	15.58	35.44	7.07	106.38	24.61	Chimney Saddle	
21/05/2019	14.04	33.28	7.30	107.86	24.26	Chimney Saddle	
22/05/2019	13.73	32.63	7.46	109.16	23.21	Chimney Saddle	
23/05/2019	12.91	33.91	7.50	108.27	24.88	Chimney Saddle	
24/05/2019	13.06	9.28	7.35	97.73	0.05	Chimney Saddle	
25/05/2019	] No Good Data For Calc	o Good Data For C	No Good Data For Cal	lo Good Data For Co	Good Data For C	Chimney Saddle	
26/05/2019	] No Good Data For Calc	o Good Data For C	No Good Data For Cal	lo Good Data For Co	Good Data For C	Chimney Saddle	
27/05/2019	] No Good Data For Calc	o Good Data For C	No Good Data For Cal	lo Good Data For Co	Good Data For C	Chimney Saddle	
28/05/2019	] No Good Data For Calc	o Good Data For C	No Good Data For Cal	lo Good Data For Co	Good Data For C	Chimney Saddle	
29/05/2019	9.35	9.87	7.27	96.22	0.00	Chimney Saddle	
30/05/2019	9.21	8.77	7.34	96.63	0.00	Chimney Saddle	
31/05/2019	9.95	7.30	7.37	99.80	0.00	Chimney Saddle	
1/06/2019	9.97	9.88	7.36	100.67	0.00	Chimney Saddle	
2/06/2019	10.01	8.20	7.27	101.03	0.00	Chimney Saddle	
3/06/2019	9.36	8.21	7.27	100.04	0.00	Chimney Saddle	
4/06/2019	8.86	12.77	7.33	99.79	0.00	Chimney Saddle	
5/06/2019	8.81	13.55	7.41	99.72	0.00	Chimney Saddle	
6/06/2019	9.55	10.05	7.21	100.82	0.00	Chimney Saddle	
7/06/2019	9.65	11.87	7.23	101.41	0.00	Chimney Saddle	
8/06/2019	9.69	12.11	7.41	101.43	0.00	Chimney Saddle	
9/06/2019	9.94	8.09	7.26	101.75	0.00	Chimney Saddle	
10/06/2019	10.54	7.73	7.18	101.43	0.00	Chimney Saddle	
11/06/2019	10.87	8.79	7.26	100.66	0.00	Chimney Saddle	
12/06/2019	11.15	9.48	7.27	100.55	0.00	Chimney Saddle	
13/06/2019	11.01	8.62	7.32	99.23	0.00	Chimney Saddle	
14/06/2019	10.34	7.83	7.29	98.68	0.00	Chimney Saddle	
15/06/2019	10.02	5.66	7.26	99.15	0.00	Chimney Saddle	
16/06/2019	9.82	6.14	7.27	100.07	0.00	Chimney Saddle	
17/06/2019	9.94	8.51	7.50	101.09	0.00	Chimney Saddle	
18/06/2019	10.35	9.39	7.51	102.16	0.00	Chimney Saddle	
19/06/2019	9.75	11.23	7.21	100.75	0.00	Chimney Saddle	
20/06/2019	8.96	13.14	7.18	100.14	0.00	Chimney Saddle	
21/06/2019	8.30	12.05	7.24	100.87	0.00	Chimney Saddle	
22/06/2019	7.89	12.94	7.31	101.95	0.00	Chimney Saddle	
23/06/2019	7.55	12.50	7.28	102.39	0.00	Chimney Saddle	
24/06/2019	7.22	14.97	7.26	102.64	0.00	Chimney Saddle	
25/06/2019	7.47	14.45	7.36	104.54	0.00	Chimney Saddle	
26/06/2019	8.00	14.11	7.15	106.39	0.00	Chimney Saddle	
27/06/2019	8.45	12.78	7.16	106.91	0.00	Chimney Saddle	
28/06/2019	8.78	5.77	6.99	107.66	0.00	Chimney Saddle	
29/06/2019	10.00	8.24	7.00	105.29	0.00	Chimney Saddle	
30/06/2019	10.07	6.97	7.20	101.80	0.00	Chimney Saddle	
1/07/2019	10.45	6.64	7.27	101.22	0.00	Chimney Saddle	
2/07/2019	10.55	13.42	7.24	100.45	0.00	Chimney Saddle	
3/07/2019	9.81	14.18	7.32	100.93	0.00	Chimney Saddle	
4/07/2019	9.21	11.67	7.25	103.15	0.00	Chimney Saddle	
5/07/2019	9.32	8.77	7.08	104.26	0.00	Chimney Saddle	
6/07/2019	10.22	4.38	7.00	106.46	0.00	Chimney Saddle	
7/07/2019	9.70	6.07	6.94	106.29	0.00	Chimney Saddle	
8/07/2019	9.65	10.14	7.14	104.69	0.00	Chimney Saddle	
9/07/2019	9.64	11.50	7.22	103.43	0.00	Chimney Saddle	
10/07/2019	10.31	7.75	7.29	102.27	0.00	Chimney Saddle	
11/07/2019	10.31	13.61	7.36	99.49	0.00	Chimney Saddle	
12/07/2019	9.79	12.58	7.26	99.36	0.00	Chimney Saddle	
13/07/2019	8.65	7.98	7.28	98.67	0.00	Chimney Saddle	
14/07/2019	8.25	7.41	7.24	100.34	0.00	Chimney Saddle	
15/07/2019	7.98	11.01	7.42	100.90	0.00	Chimney Saddle	
16/07/2019	8.45	12.54	7.26	101.63	0.00	Chimney Saddle	

DATE TIME	WASTE WATER OUTFALL TEMP °C	WASTE WATER OUTFALL FLOW (m³/hr)	WASTE WATER OUTFALL PH	WASTE WATER OUTFALL DISOLVED OXYGEN (%)	COOLING TOWER BLOWDOWN m³/hr	WATER SUPPLY	OPERATIONAL COMMENTS / ISSUES
17/07/2019	8.93	6.40	7.22	102.18	0.00	Chimney Saddle	
18/07/2019	8.53	7.04	7.24	100.75	0.00	Chimney Saddle	
19/07/2019	8.86	8.30	7.14	101.37	0.00	Chimney Saddle	
20/07/2019	9.38	6.31	7.21	102.62	0.00	Chimney Saddle	
21/07/2019	9.76	5.40	7.24	102.32	0.00	Chimney Saddle	
22/07/2019	10.12	6.44	7.17	101.76	0.00	Chimney Saddle	
23/07/2019	10.35	11.92	7.27	101.07	0.00	Chimney Saddle	
24/07/2019	9.73	13.73	7.39	99.38	0.00	Chimney Saddle	
25/07/2019	10.32	8.21	7.06	100.60	0.00	Chimney Saddle	
26/07/2019	11.07	10.62	7.11	100.78	0.00	Chimney Saddle	
27/07/2019	10.31	12.55	7.25	100.08	0.00	Chimney Saddle	
28/07/2019	9.99	6.64	6.98	100.40	0.00	Chimney Saddle	
29/07/2019	9.95	9.75	7.10	99.73	0.00	Chimney Saddle	
30/07/2019	9.20	21.77	6.96	98.85	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo
31/07/2019	8.74	78.03	6.73	98.71	0.00	Chimney Saddle	
1/08/2019	8.85	137.76	6.64	97.94	0.00	Chimney Saddle	
2/08/2019	8.90	192.25	6.78	97.09	0.00	Chimney Saddle	
3/08/2019	9.13	210.06	6.98	97.56	0.00	Chimney Saddle	
4/08/2019	8.87	214.24	7.00	97.06	0.00	Chimney Saddle	
5/08/2019	8.88	106.92	6.95	96.05	0.00	Chimney Saddle	
6/08/2019	9.55	12.13	6.99	97.71	0.00	Chimney Saddle	
7/08/2019	9.49	23.50	7.19	96.17	0.00	Chimney Saddle	
8/08/2019	8.88	89.42	6.80	90.94	0.00	Chimney Saddle	
9/08/2019	8.62	90.77	6.75	91.16	0.00	Chimney Saddle	
10/08/2019	8.87	6.73	6.97	91.37	0.00	Chimney Saddle	
11/08/2019	8.62	4.91	7.07	88.22	0.00	Chimney Saddle	
12/08/2019	8.78	8.51	7.09	87.84	0.00	Chimney Saddle	
13/08/2019	9.21	11.88	7.16	88.71	0.00	Chimney Saddle	
14/08/2019	10.02	11.85	7.22	90.39	0.00	Chimney Saddle	
15/08/2019	10.45	8.89	7.23	92.03	0.00	Chimney Saddle	
16/08/2019	10.42	11.52	7.28	91.99	0.00	Chimney Saddle	
17/08/2019	9.73	6.57	7.27	94.29	0.00	Chimney Saddle	
18/08/2019	10.58	4.19	7.37	97.88	0.00	Chimney Saddle	
19/08/2019	10.10	5.80	7.43	100.49	0.00	Chimney Saddle	
20/08/2019	10.37	5.55	7.54	103.65	0.00	Chimney Saddle	
21/08/2019	10.29	12.69	7.48	102.08	0.00	Chimney Saddle	
22/08/2019	9.59	38.63	7.41	96.40	0.00	Chimney Saddle	
23/08/2019	9.44	88.73	7.39	95.12	0.00	Chimney Saddle	
24/08/2019	10.37	115.55	7.44	96.47	0.00	Chimney Saddle	Preparation for demin and permeate tank liner repair
25/08/2019	10.41	95.55	7.46	94.13	0.00	Chimney Saddle	
26/08/2019	10.49	10.82	7.43	94.61	0.00	Chimney Saddle	
27/08/2019	10.91	22.94	7.39	98.26	0.00	Chimney Saddle	
28/08/2019	11.11	64.31	7.46	98.57	0.00	Chimney Saddle	
29/08/2019	10.72	53.46	7.39	95.89	0.00	Chimney Saddle	
30/08/2019	10.45	16.89	7.39	94.08	0.00	Chimney Saddle	
31/08/2019	11.20	4.88	7.44	98.09	0.00	Chimney Saddle	
1/09/2019	11.53	1.29	7.48	99.88	0.00	Chimney Saddle	Pond totally drained to be cleaned whilst tank liner work was being carried out
2/09/2019	11.28	0.37	7.06	94.51	0.00	Chimney Saddle	
3/09/2019	12.32	0.00	6.72	83.20	0.00	Chimney Saddle	
4/09/2019	10.88	0.00	6.71	71.00	0.00	Chimney Saddle	
5/09/2019	7.68	0.00	6.71	62.66	0.00	Chimney Saddle	
6/09/2019	8.81	0.00	6.71	60.59	0.00	Chimney Saddle	
7/09/2019	9.24	0.00	6.72	60.71	0.00	Chimney Saddle	
8/09/2019	8.12	0.00	6.71	59.31	0.00	Chimney Saddle	
9/09/2019	8.81	0.00	6.71	55.26	0.00	Chimney Saddle	
10/09/2019	8.16	0.00	6.71	52.65	0.00	Chimney Saddle	
11/09/2019	11.76	0.00	6.71	51.49	0.00	Chimney Saddle	
12/09/2019	11.58	0.00	6.71	48.26	0.00	Chimney Saddle	
13/09/2019	8.28	0.00	6.71	45.86	0.00	Chimney Saddle	
14/09/2019	11.16	0.00	6.71	46.25	0.00	Chimney Saddle	
15/09/2019	12.62	0.00	6.71	43.38	0.00	Chimney Saddle	
16/09/2019	9.38	0.00	6.71	39.61	0.00	Chimney Saddle	
17/09/2019	6.89	0.00	6.72	39.96	0.00	Chimney Saddle	
18/09/2019	8.61	0.00	6.71	41.89	0.00	Chimney Saddle	
19/09/2019	11.90	0.00	6.71	41.93	0.00	Chimney Saddle	
20/09/2019	16.88	0.00	6.71	41.07	0.00	Chimney Saddle	
21/09/2019	14.23	0.00	6.71	37.33	0.00	Chimney Saddle	
22/09/2019	13.03	1.61	6.71	37.29	0.00	Chimney Saddle	
23/09/2019	13.48	4.84	6.71	36.95	0.00	Chimney Saddle	
24/09/2019	13.47	5.25	6.88	72.24	0.00	Chimney Saddle	
25/09/2019	13.94	11.32	7.04	100.14	0.00	Chimney Saddle	
26/09/2019	14.60	8.30	7.09	99.97	0.00	Chimney Saddle	
27/09/2019	14.25	8.28	7.33	97.21	0.00	Chimney Saddle	
28/09/2019	13.90	4.88	7.46	89.67	0.00	Chimney Saddle	
29/09/2019	13.69	3.78	7.49	86.60	0.00	Chimney Saddle	
30/09/2019	14.08	6.68	7.39	88.99	0.00	Chimney Saddle	
1/10/2019	14.65	8.61	7.31	92.15	0.00	Chimney Saddle	
2/10/2019	15.39	10.11	7.29	96.81	0.00	Chimney Saddle	
3/10/2019	16.28	5.89	7.32	100.48	0.00	Chimney Saddle	
4/10/2019	16.61	14.78	7.52	103.77	0.00	Chimney Saddle	
5/10/2019	15.98	8.46	7.74	104.98	0.00	Chimney Saddle	
6/10/2019	15.72	5.95	7.87	105.52	0.00	Chimney Saddle	
7/10/2019	15.52	8.68	7.96	106.76	0.00	Chimney Saddle	
8/10/2019	15.80	7.82	8.00	111.33	0.00	Chimney Saddle	
9/10/2019	15.97	10.57	7.91	118.76	0.00	Chimney Saddle	
10/10/2019	15.79	12.11	8.49	125.99	0.00	Chimney Saddle	
11/10/2019	15.62	10.26	8.93	124.34	0.00	Chimney Saddle	
12/10/2019	15.08	6.03	9.09	122.21	0.00	Chimney Saddle	
13/10/2019	15.25	6.48	9.18	120.93	0.00	Chimney Saddle	
14/10/2019	16.04	18.15	9.19	120.10	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo
15/10/2019	16.56	94.96	9.23	124.92	0.00	Chimney Saddle	
16/10/2019	16.32	155.25	9.23	133.24	0.00	Chimney Saddle	
17/10/2019	15.55	196.07	9.01	123.07	0.00	Chimney Saddle	
18/10/2019	15.03	213.09	8.79	109.92	0.00	Chimney Saddle	
19/10/2019	13.78	209.12	8.48	99.42	0.00	Chimney Saddle	
20/10/2019	13.65	211.60	8.19	98.15	0.00	Chimney Saddle	
21/10/2019	14.71	113.95	7.99	98.13	0.00	Chimney Saddle	
22/10/2019	16.23	9.32	7.85	99.02	0.00	Chimney Saddle	
23/10/2019	17.04	10.15	7.75	98.52	0.00	Chimney Saddle	
24/10/2019	17.85	13.39	7.68	98.01	0.00	Chimney Saddle	
25/10/2019	17.48	12.09	7.72	97.30	0.00	Chimney Saddle	
26/10/2019	15.92	8.19	7.81	96.91	0.00	Chimney Saddle	
27/10/2019	15.25	9.30	7.81	97.87	0.00	Chimney Saddle	
28/10/2019	15.51	11.27	7.82	99.46	0.00	Chimney Saddle	
29/10/2019	16.21	11.46	7.92	102.20	0.00	Chimney Saddle	
30/10/2019	16.88	13.47	8.05	104.28	0.00	Chimney Saddle	
31/10/2019	17.61	13.48	8.25	108.98	0.00	Chimney Saddle	
1/11/2019	18.60	15.76	8.48	114.58	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo

DATE TIME	WASTE WATER OUTFALL TEMP °C	WASTE WATER OUTFALL FLOW (m³/hr)	WASTE WATER OUTFALL PH	WASTE WATER OUTFALL DISOLVED OXYGEN (%)	COOLING TOWER BLOWDOWN m³/hr	WATER SUPPLY	OPERATIONAL COMMENTS / ISSUES
2/11/2019	18.55	84.46	8.82	117.73	0.00	Chimney Saddle	
3/11/2019	17.76	175.33	9.19	128.56	0.00	Chimney Saddle	
4/11/2019	17.52	210.19	8.91	117.61	0.00	Chimney Saddle	
5/11/2019	17.32	209.24	8.57	105.34	0.00	Chimney Saddle	
6/11/2019	16.80	128.35	8.29	99.47	0.00	Chimney Saddle	
7/11/2019	15.29	7.19	8.09	97.40	0.00	Chimney Saddle	
8/11/2019	14.89	7.86	8.04	97.00	0.00	Chimney Saddle	
9/11/2019	14.61	5.46	8.02	97.44	0.00	Chimney Saddle	
10/11/2019	14.46	4.93	7.95	98.87	0.00	Chimney Saddle	
11/11/2019	15.12	6.82	7.91	99.70	0.00	Chimney Saddle	
12/11/2019	15.89	6.87	7.95	100.51	0.00	Chimney Saddle	
13/11/2019	14.77	6.81	7.98	99.68	0.00	Chimney Saddle	
14/11/2019	15.08	4.93	8.07	101.76	0.00	Chimney Saddle	
15/11/2019	15.39	6.08	8.13	102.21	0.00	Chimney Saddle	
16/11/2019	14.89	3.75	8.22	102.38	0.00	Chimney Saddle	
17/11/2019	15.18	4.80	8.41	104.85	0.00	Chimney Saddle	
18/11/2019	15.69	5.46	8.52	106.30	0.00	Chimney Saddle	
19/11/2019	16.84	2.72	8.62	108.21	0.00	Chimney Saddle	
20/11/2019	17.53	8.75	8.78	110.99	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo
21/11/2019	18.15	17.81	8.81	112.34	0.00	Chimney Saddle	
22/11/2019	18.29	60.30	9.15	122.34	0.00	Chimney Saddle	
23/11/2019	18.26	82.45	8.91	113.24	0.00	Chimney Saddle	
24/11/2019	17.84	112.99	8.70	102.41	0.00	Chimney Saddle	
25/11/2019	18.17	158.58	8.50	100.54	0.00	Chimney Saddle	
26/11/2019	18.64	137.25	8.19	98.41	0.00	Chimney Saddle	
27/11/2019	17.85	6.63	7.89	97.98	0.00	Chimney Saddle	
28/11/2019	17.65	5.60	7.90	98.95	0.00	Chimney Saddle	
29/11/2019	18.26	13.29	8.15	102.32	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo
30/11/2019	18.00	44.95	8.90	114.94	0.00	Chimney Saddle	
1/12/2019	17.64	66.65	8.70	105.86	0.00	Chimney Saddle	
2/12/2019	16.91	89.15	8.39	98.84	0.00	Chimney Saddle	
3/12/2019	16.08	48.54	8.16	97.37	0.00	Chimney Saddle	
4/12/2019	14.83	3.88	8.12	97.61	0.00	Chimney Saddle	
5/12/2019	15.42	3.49	8.11	99.66	0.00	Chimney Saddle	
6/12/2019	15.41	8.62	8.42	103.86	0.00	Chimney Saddle	Valve closed due to high dissolved oxygen, dosed with hypo
7/12/2019	15.56	21.15	8.84	109.77	0.00	Chimney Saddle	
8/12/2019	17.19	36.50	8.63	107.25	0.00	Chimney Saddle	
9/12/2019	18.72	53.42	8.47	105.19	0.00	Chimney Saddle	
10/12/2019	19.76	85.43	8.42	104.00	0.00	Chimney Saddle	
11/12/2019	20.27	108.52	8.31	101.89	0.00	Chimney Saddle	
12/12/2019	20.38	130.38	8.22	100.10	0.00	Curries River	
13/12/2019	19.40	77.87	8.33	98.72	0.00	Curries River	
14/12/2019	18.75	32.46	8.82	110.43	0.00	Curries River	
15/12/2019	18.43	63.65	8.56	106.46	0.00	Curries River	
16/12/2019	18.30	83.75	8.31	101.23	0.00	Curries River	
17/12/2019	19.88	130.29	8.21	102.15	0.00	Curries River	
18/12/2019	20.79	188.27	8.07	101.30	0.00	Curries River	
19/12/2019	21.34	212.34	7.95	99.44	0.00	Curries River	
20/12/2019	21.94	110.48	8.01	99.97	0.00	Curries River	
21/12/2019	22.56	93.74	8.15	110.20	0.00	Curries River	
22/12/2019	22.17	111.55	8.05	109.73	0.00	Curries River	
23/12/2019	21.77	129.87	7.86	102.03	0.00	Curries River	
24/12/2019	21.53	68.66	7.96	98.13	0.00	Curries River	
25/12/2019	21.87	3.52	8.03	99.80	0.00	Curries River	
26/12/2019	22.91	4.18	8.04	101.78	0.00	Curries River	
27/12/2019	22.77	5.39	8.19	102.27	0.00	Curries River	
28/12/2019	23.53	10.42	8.26	105.82	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
29/12/2019	23.92	56.02	8.35	107.66	0.00	Curries River	
30/12/2019	24.01	163.31	8.45	109.78	0.00	Curries River	
31/12/2019	23.93	209.74	8.25	109.32	0.00	Curries River	
1/01/2020	22.60	132.78	7.90	100.38	0.00	Curries River	
2/01/2020	21.79	8.16	7.99	96.25	0.00	Curries River	
3/01/2020	22.16	8.09	7.99	98.56	0.00	Curries River	
4/01/2020	22.27	5.62	8.04	100.69	0.00	Curries River	
5/01/2020	20.83	4.16	8.13	102.35	0.00	Curries River	
6/01/2020	20.95	49.44	8.31	105.95	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
7/01/2020	22.01	122.24	8.13	106.00	0.00	Curries River	
8/01/2020	22.96	153.71	7.68	104.38	0.00	Curries River	
9/01/2020	24.29	88.90	7.66	99.26	0.00	Curries River	
10/01/2020	23.40	6.91	7.75	97.25	0.00	Curries River	
11/01/2020	20.46	5.09	8.08	99.08	0.00	Curries River	
12/01/2020	20.71	4.51	8.20	104.07	0.00	Curries River	
13/01/2020	21.71	12.63	8.32	108.66	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
14/01/2020	22.78	73.26	8.30	111.20	0.00	Curries River	
15/01/2020	23.52	109.32	7.97	114.71	0.00	Curries River	
16/01/2020	22.62	134.02	7.80	106.59	0.00	Curries River	
17/01/2020	20.21	71.33	7.86	100.51	0.00	Curries River	
18/01/2020	20.06	4.38	7.98	100.94	0.00	Curries River	
19/01/2020	20.03	6.05	8.07	96.43	1.31	Curries River	
20/01/2020	20.16	12.20	8.05	97.39	0.00	Curries River	
21/01/2020	20.13	8.21	8.15	101.74	0.00	Curries River	
22/01/2020	20.67	9.39	8.30	107.95	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
23/01/2020	19.68	51.66	10.00	109.80	0.00	Curries River	
24/01/2020	18.73	93.48	9.15	118.86	0.00	Curries River	
25/01/2020	19.30	114.24	8.29	112.04	0.00	Curries River	
26/01/2020	19.66	134.03	8.24	104.79	0.00	Curries River	
27/01/2020	19.37	150.52	8.27	100.07	0.00	Curries River	
28/01/2020	19.56	178.52	8.23	98.71	0.00	Curries River	
29/01/2020	20.81	100.91	8.21	101.04	0.00	Curries River	
30/01/2020	22.14	4.97	8.23	106.76	0.00	Curries River	
31/01/2020	22.92	13.50	8.40	119.17	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
1/02/2020	23.01	44.06	8.72	134.90	0.00	Curries River	
2/02/2020	20.87	68.21	8.59	118.95	0.00	Curries River	
3/02/2020	19.21	89.59	8.34	103.49	0.00	Curries River	
4/02/2020	19.46	53.18	8.32	101.98	0.00	Curries River	
5/02/2020	20.49	3.19	8.35	101.02	0.00	Curries River	
6/02/2020	21.08	5.05	8.27	99.22	0.00	Curries River	
7/02/2020	21.46	5.42	8.27	101.68	0.00	Curries River	
8/02/2020	21.62	2.56	8.36	105.66	0.00	Curries River	
9/02/2020	21.22	3.19	8.45	108.92	0.00	Curries River	
10/02/2020	20.26	3.99	8.52	107.99	0.00	Curries River	
11/02/2020	20.73	3.40	8.54	110.87	0.00	Curries River	
12/02/2020	22.37	8.99	8.51	113.50	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
13/02/2020	22.77	27.83	8.51	123.86	0.00	Curries River	

Tamar Valley Power Station

DATE TIME	WASTE WATER OUTFALL TEMP °C	WASTE WATER OUTFALL FLOW (m³/hr)	WASTE WATER OUTFALL PH	WASTE WATER OUTFALL DISOLVED OXYGEN (%)	COOLING TOWER BLOWDOWN m³/hr	WATER SUPPLY	OPERATIONAL COMMENTS / ISSUES
14/02/2020	23.34	65.68	8.21	124.46	0.00	Curries River	
15/02/2020	22.87	94.16	8.02	111.81	0.00	Curries River	
16/02/2020	20.50	125.97	7.93	99.68	0.00	Curries River	
17/02/2020	20.09	152.79	7.94	99.94	0.00	Curries River	
18/02/2020	19.83	82.48	7.94	100.82	0.00	Curries River	
19/02/2020	17.71	10.95	7.96	98.42	0.00	Curries River	
20/02/2020	17.43	4.30	8.04	103.88	0.00	Curries River	
21/02/2020	18.04	6.04	8.10	107.23	0.00	Curries River	
22/02/2020	18.57	2.51	8.27	110.17	0.00	Curries River	
23/02/2020	19.98	5.65	8.45	115.84	0.00	Curries River	
24/02/2020	20.74	28.23	8.49	117.06	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
25/02/2020	21.08	108.10	8.33	116.74	0.00	Curries River	
26/02/2020	20.46	187.32	7.86	108.87	0.00	Curries River	
27/02/2020	18.89	217.47	7.55	98.96	0.00	Curries River	
28/02/2020	18.20	101.41	7.59	94.71	0.00	Curries River	
29/02/2020	18.75	3.50	7.62	98.00	0.00	Curries River	
1/03/2020	18.96	3.22	7.57	98.51	0.00	Curries River	
2/03/2020	19.12	5.96	7.61	98.92	0.00	Curries River	
3/03/2020	18.98	7.54	7.65	100.40	0.00	Curries River	
4/03/2020	19.26	5.84	7.77	103.91	0.00	Curries River	
5/03/2020	18.79	17.66	7.74	100.79	0.43	Curries River	
6/03/2020	19.48	9.02	7.55	103.06	0.72	Curries River	
7/03/2020	18.47	4.40	7.28	104.22	0.00	Curries River	
8/03/2020	17.69	4.73	7.45	104.42	0.00	Curries River	
9/03/2020	17.84	2.48	7.50	109.32	0.00	Curries River	
10/03/2020	17.96	5.79	7.64	112.38	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
11/03/2020	18.51	17.62	7.79	112.23	0.00	Curries River	
12/03/2020	19.58	28.66	7.70	112.88	0.00	Curries River	
13/03/2020	19.51	58.26	7.91	110.09	0.00	Curries River	
14/03/2020	17.99	78.73	7.98	111.14	0.00	Curries River	
15/03/2020	18.14	89.23	7.36	112.09	0.00	Curries River	
16/03/2020	18.40	108.94	7.38	109.00	0.00	Curries River	
17/03/2020	18.46	163.86	7.41	102.39	0.00	Curries River	
18/03/2020	18.87	96.09	7.33	98.63	0.00	Curries River	
19/03/2020	18.61	5.40	7.36	98.54	0.00	Curries River	
20/03/2020	18.07	7.29	7.58	97.94	0.00	Curries River	
21/03/2020	17.84	4.05	7.63	100.80	0.00	Curries River	
22/03/2020	18.06	4.02	7.77	103.54	0.00	Curries River	
23/03/2020	17.49	4.79	7.93	105.88	0.00	Curries River	
24/03/2020	17.18	3.32	8.14	108.60	0.00	Curries River	
25/03/2020	17.18	4.51	8.34	112.34	0.00	Curries River	Valve closed due to high dissolved oxygen, dosed with hypo
26/03/2020	16.85	18.30	8.34	111.19	0.00	Curries River	
27/03/2020	17.12	45.25	7.67	115.44	0.00	Curries River	
28/03/2020	17.72	61.43	7.52	126.03	0.00	Curries River	
29/03/2020	18.08	80.88	7.26	127.26	0.00	Curries River	
30/03/2020	17.82	118.79	7.38	112.92	0.00	Curries River	
31/03/2020	17.41	147.40	7.43	104.03	0.00	Curries River	

Min	**0.00**	**6.64**	**86.60**
Max	**5.22**	**10.00**	**134.90**
Average per day	**41.82**	**7.73**	**103.72**
EPN limit:	**208.33**	**6.5-8.5**	**80 to 100**

Notes:

Flow rate per day, calculated via extrapolation of the 5 ML/day EPN limit

DO calculations ignore blue shaded cells

Min	**0.00**	**ML/day**
Max	**5.22**	**ML/day**
Average flow rate per day	**0.99**	**ML/day**
Maximum flow rate per year	**363.35**	**ML/yr**

Comparison of flow rate with EPN limits:	**5**	**ML/day**
	550	**ML/yr**

(Flow rate converson based on 1 m3/hr = 0.024 ML/day)

LEGEND:

No good data for calculation
Pond Outlet Valve Closed
Maintenance shut; WWRP drained

APPENDIX G3

Monthly WWRP outfall (DP1) and inline water quality results 2019/20

Wastewater Retention Pond (WWRP) & In-Line Water Quality (Monthly) Monitoring Test Results

	OUTFALL DISCHARGE POINT MONTHLY GRAB SAMPLE / PORTABLE METER (DP1) MONITORING																	IN-LINE MONITORING							
											Total Petroleum Hydrocarbons														
Date / Parameter	**Suspended Solids (SS)**	**pH (Outfall)**	**Free Chlorine**	**Biochemical Oxygen Demand (BOD)**	**Chemical Oxygen Demand (COD)**	**Total Phosphorus**	**Ammonia Nitrogen**	**Nitrite + Nitrate as N**	**Total Kjeldahl Nitrogen as N (TKN)**	**Total Nitrogen**	**C6 - C9 Fraction**	**C10 - C14 Fraction**	**C15 - C28 Fraction**	**C29 - C36 Fraction**	**C10-C36 Fraction (sum)**	**WWRP Trihalomethanes (total)**	**Dissolved Oxygen (% sat.)**	**Dissolved Oxygen (%sat.)**	**Temp Deg.C**	**pH**	**Flow kL/hr**	**Time**	**Water supply**	**Unit 201 in operation**	**Notes**
90th Percentile	**8**					**0.5**				**0.5**															
EPN imit (2013)	**10**	**6.5 -8.5**	**0.1**	**5**		**1**	**0.5**			**5**	**No Limits Set * (Use 500 µg/L)**				**500 ***		**80-100%**		**Deg.C of ambient**	**6.5-8.5**	**208.33kL/hr**				
Unit	**mg/L**	**Value**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**					**5ML/day**				
																					550ML/yr				
3/04/2019	<5	7.62	0.03	<2	60	***0.61***	0.05	0.18	1.1	***1.3***	<20	<50	<100	<50	<50	87	93.50	104.76	16.40	7.62	29.50	9.05	To 13-May-19	Offline, restarted 17-Apr-19	Unit 201 offline, restarted 17/4/19.
28/05/2019	<5	8.27	0.06	<2	26	***0.58***	**0.98**	0.59	1.1	***1.7***	<20	<50	<100	<50	<50	<5	96.10	98.39	11.60	8.23	12.00	10.11	From 13-May-19	Offline on 19-May-19	Unit 201 taken offline 19/5/19.
19/06/2019	<5	7.9	0.08	<2	<10	0.07	0.03	0.42	<0.1	0.4	<20	<50	<100	<50	<50	26	90.20	99.80	9.40	7.30	9.20	10.00			Unit 201 offline.
25/07/2019	<5	7.8	0.09	<2	<10	0.02	<0.01	0.60	<0.1	***0.6***	<20	<50	<100	<50	<50	12	86.80	100.44	10.05	7.06	4.19	9.44			Unit 201 offline.
22/08/2019	<5	7.77	0.04	<2	<10	0.09	0.04	0.19	0.1	0.3	<20	<50	<100	<50	<50	<5	94.70	103.00	10.10	7.51	9.60	8.45			Unit 201 offline. Whole station maintenance outage, Water treatement plant outage, no flow through WWRP, so no discharge to sample.
19/09/2019																									Whole station maintenance outage. No flow through WWRP, so no discharge to sample, orinline monitoring data collected.
16/10/2019																		132.00	16.20	7.90	0.00	9.30			Unit 201 offline. No discharge (WWRP outlet valve closed while sodium hypochlorite dosing to reduce high DO, and resultant balancing of free chlorine levels). A sample was collected from within the WWRP pond for analysis and internal equipment calibration purposes (results within acceptable WQ parameters).
12/11/2019	<5	7.58	0.03	**6**	<10	0.05	0.04	0.08	<0.1	<0.1	<20	<50	<100	<50	<50	<5	93.30	100.36	16.05	7.92	7.36	9.09			Unit 201 offline. BOD non-compliance was associated with algal growth under low flow conditions. EPA notified of BOD non-compliance.
3/12/2019	<5	7.87	0.02	<2	<10	0.05	0.12	0.05	0.1	0.2	<20	<50	<100	<50	<50	<5	97.90	97.18	15.90	8.15	81.10	8.20	To 12-Dec-2019		Unit 201 offline. Continued intermittent closure of pond outlet during the month. Pond outlet valve had been closed for several days to treat algal growth within the pond. Outlet valve reopened at 7.57, prior to sampling at 8.20. Changed over to Curries water supply on 12/12/2019.
13/01/2020	<5	8.27	0.03	2	<10	0.02	0.05	0.03	0.6	***0.6***	<20	<50	<100	<50	<50	6	97.70	109.32	22.15	8.48	Se	10.45			Unit 201 offline. WWRP outlet valves were closed following the sampling due to high oxygen and pH levels.
11/02/2020	<5	7.38	0.04	3	<10	0.03	0.06	0.07	0.2	0.3	<20	<50	<100	<50	<50	<5	90.10	110.00	19.90	**8.60**	3.24	9.42			Unit 201 offline. WWRP closed after sampling due to high DO and pH and pond was dosed with sodium hypochlorite. Discharge flow has been low due to inoperation of peaking plant
18/03/2020	<5	8.17	0.04	4	12	0.03	0.03	0.04	0.5	*0.5*	70	<50	<100	<50	<50	150	96.00	98.70	18.89	7.38	35.90	12.35			Unit 201 offline (COVID-19 logistical issues). WWRP outlet valves had been closed prior to 08:00am (i.e. valves reopened at 8am). Pond had been dosed with sodium hypo chlorite on 17/03/2020. Light rain at time of sampling.

LEGEND:

Bold	Analysis results are on/above limit or outside of range.
Italics	Result on or above the 90th percentile.
	Station shut in September 2019 and WWRP refilling and/or no WWRP discharge to sample in October 2019.
	Curries River untreated water supply
	Chimney Saddle treated water supply
	Unit 201 is offline / in layup

* Use 500 µg/L as per stormwater for comparison

Note: 1m3/hr = 0.024 ML/day
Note: 1m3/hr = ML/year

APPENDIX G4

Quarterly stormwater discharge (DP2) water quality results 2019/20

Stormwater Water Quality (Quarterly) Monitoring Test Results

	Suspended Solids (SS)	Oil & Grease	Biochemical Oxygen Demand (BOD)	EP080/071: Total Petroleum Hydrocarbons	C6 -C9 Fraction	C10 -C14 Fraction	C15 -C28 Fraction	C29 -C36 Fraction	C10-C36 Fraction (sum)	Sampler	Comments
Permit Limit	**20**	**5**	**15**		**500**				**500**		
Unit	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L		
Date											
28/05/2019	<5	<5	<2	-	<20	<50	<100	120	120	AETV	No oil visible on surface. Clean, slightly turbid (recent rain).
22/08/2019	<5	<5	<2	-	<20	<50	<100	<50	<100	AETV	No visible oil. Clean & clear. Recent rain. Stagnant water type smell to the samples.
12/11/2019	8	<5	13	-	<20	<50	<100	110	110	AETV	Clean and clear, minimal flow. No sediment or oil on surface. Sample smells of stagnant water.
11/02/2020	23	<5	**20**	-	<20	<50	230	440	**670**	AETV	Clear, no oil on surface, slightly turbid, minimal flow due to recent rain event. Investigated and EPA advised of non-compliance.

LEGEND:

Bold Analysis results are above limits, or higher than typical results for this parameter.

APPENDIX G5

Quarterly Donovans Bay field and laboratory results 2019/20 and graphs

Donovans Bay (Quarterly) Field Monitoring Test Results

AETV Power - Tamar Valley Power Station, Bell Bay

*The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues

Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D1	1m below surface	0491710	5445720	28/09/16	9.36	14.17	1.0	7.73	38912	100.9	8.69	71	1.64	3.2	Green. Nil odour	High tide	Fine, clear skies.
D1	1m below surface	0491710	5445720	12/12/16	9.30	16.79	1.0	7.71	38770	91.6	7.48	418	0.79	2.9	Green, lots of filamentous weed	High tide	Cloudy
D1	1m below surface	0491710	5445720	08/03/17	9.04	19.72	1.0	8.02	54173	90.6	6.58	427	1.56	3.0	Greenish	Full tide at 8.30 am	
D1	1m below surface	0491710	5445720	06/06/17	9.39	13.36	1.0	7.84	41760	86.9	7.38		0.57	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D1	1m below surface	0491710	5445720	20/09/17	10.20	11.29	1.0	8.06	33494	106.1	9.71	635	0.59	3.0	-	Cloudy, full tide at 10am	Cloudy.
D1	1m below surface	0491710	5445720	13/12/17	8.28	18.70	1.0	7.88	45511	96.8	7.36	1019	1.55	3.0	-	High tide at 8.05 am	ORP calibration problem.
D1	1m below surface	0491710	5445720	13/03/18	8.48	19.81	1.0	8.05	51447	96.9	7.27	345	0.70	2.5	-	High tide at 9.00 am	
D1	1m below surface	0491710	5445720	25/06/18	10.21	11.14	1.0	8.15	34897	93.4	8.60	383	0.92	3.2	Clear, nil odour	High tide at 9.10 am	Fine.
D1	1m below surface	0491710	5445720	24/09/18	10.26	12.10	1.0	8.17	31500	94.3	9.17	98	0.00	2.5	-	High tide at 10.30	Sunny, with light southeast breeze
D1	1m below surface	0491710	5445720	18/12/18	10.00	19.10	1.0	8.03	40389	84.8	6.73	-18	3.00	3.3	-	High tide at 9.30	Overcast, light winds
D1	1m below surface	0491710	5445720	19/03/19	10.07	18.90	1.0	7.45	45769	91.0	6.77	53	0.00	3.4	-	High tide at 10.15	Overcast
D1	1m below surface	0491710	5445720	18/06/19	12.45	11.80	1.0	7.90	36170	74.0	8.01	112	3.90	3.3	No flow over spillway	High tide at 1.00 pm	Drizzly, calm.
D1	1m below surface	0491710	5445720	12/09/19	10.16	11.60	1.0	7.65	33938	80.9	8.80	123	1.00	3.5	Windy	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D1	1m below surface	0491710	5445720	09/12/19	10.15	15.40	1.0	8.12	42008	77.5	7.75	120	1.40	3.5	-	High tide at 9.20am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D1 *	1m below surface	0491710	5445720	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D1	1m above seafloor	0491710	5445720	28/09/16	9.39	13.49	2.2	7.96	39592	101.7	8.83	64	1.66	3.2	Green, nil odour	High tide	Fine, clear skies.
D1	1m above seafloor	0491710	5445720	12/12/16	9.35	16.72	1.9	7.80	39148	89.7	7.34	467	1.55	2.9	Green, lots of filamentous weed	High tide	Cloudy
D1	1m above seafloor	0491710	5445720	08/03/17	9.10	19.69	2.0	8.03	54519	91.4	6.63	496	2.26	3.0	Greenish	Full tide at 8.30 am	
D1	1m above seafloor	0491710	5445720	06/06/17	9.49	13.43	2.0	8.11	41988	88.2	7.47		2.17	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D1	1m above seafloor	0491710	5445720	20/09/17	10.32	11.38	2.0	8.10	34269	106.2	9.67	882	0.24	3.0	-	Cloudy, full tide @ 10am	Cloudy.
D1	1m above seafloor	0491710	5445720	13/12/17	8.38	18.69	2.0	7.93	45614	95.7	7.27	1033	1.27	3.0	-	High tide at 8.05am	Problem with ORP calibration.
D1	1m above seafloor	0491710	5445720	13/03/18	9.02	19.89	2.3	8.07	52094	95.8	7.17	422	0.70	3.3	-	High tide at 9.00 am	
D1	1m above seafloor	0491710	5445720	25/06/18	10.22	11.33	2.2	8.16	36067	93.1	8.48	415	4.33	3.2	Clear, nil odour	High tide at 9.10 am	Fine.
D1	1m above seafloor	0491710	5445720	24/09/18	10.43	13.00	1.5	8.21	34000	100.2	8.91	94	7.30	2.5	-	High tide at 10.30	Sunny, with light southeast breeze. DUP01
D1	1m above seafloor	0491710	5445720	18/12/18	10.15	19.00	2.3	8.06	41096	82.2	6.57	-51	2.00	3.3	-	High tide at 9.30	Overcast, light winds
D1	1m above seafloor	0491710	5445720	19/03/19	10.23	18.90	2.4	7.51	46228	94.7	7.05	55	0.00	3.4	-	High tide at 10.15	Overcast
D1	1m above seafloor	0491710	5445720	18/06/19	1.00	11.90	2.3	7.98	36760	76.4	8.25	108	3.80	3.3	-	High tide at 1.00 pm	Drizzly, calm.
D1	1m above seafloor	0491710	5445720	12/09/19	10.30	11.70	1.7	7.84	34832	82.7	8.98	115	1.50	2.7	Rough drifted.	High tide at 10.30 am	Windy and overcast. No rain. DUP01 Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D1	1m above seafloor	0491710	5445720	09/12/19	10.25	15.40	2.5	8.11	42095	71.8	7.18	121	2.10	3.5	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D1 *	1m above seafloor	0491710	5445720	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D2	1m below surface	0491590	5445695	28/09/16	10.02	13.59	3.5	7.95	39456	101.5	8.79	62	1.66	3.5	Light green, nil odour	High tide	Fine, clear skies.
D2	1m below surface	0491590	5445695	12/12/16	9.55	16.74	2.3	7.90	38881	92.0	7.52	350	0.64	3.3	Green, lots of filamentous weeds	High tide	Cloudy
D2	1m below surface	0491590	5445695	08/03/17	9.20	19.52	1.0	8.02	53916	91.4	6.67	492	1.46	3.0	Greenish	Full tide at 8.30 am	
D2	1m below surface	0491590	5445695	06/06/17	10.04	13.48	1.0	8.14	42132	89.0	7.53		0.55	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D2	1m below surface	0491590	5445695	20/09/17	10.58	11.42	1.0	8.08	35285	104.2	9.41	1054	0.44	3.0	-	Cloudy, full tide @ 10 am	Cloudy.
D2	1m below surface	0491590	5445695	13/12/17	8.50	18.74	1.0	7.95	45637	97.1	7.37	1016	1.48	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D2	1m below surface	0491590	5445695	13/03/18	9.10	19.88	1.0	8.08	51745	98.2	7.35	450	0.70	3.2	-	High tide at 9.00 am	
D2	1m below surface	0491590	5445695	25/06/18	10.36	11.15	1.0	8.23	34674	91.4	8.43	402	1.98	3.0	Clear, nil odour	High tide at 9.10 am	Fine. DUP01
D2	1m below surface	0491590	5445695	24/09/18	10.57	12.20	1.0	8.18	31990	98.0	8.88	118	0.00	2.0	-	High tide at 10.30	Sunny, with light southeast breeze
D2	1m below surface	0491590	5445695	18/12/18	10.30	19.10	1.0	8.06	40175	86.7	6.85	42	1.00	2.3	-	High tide at 9.30	Overcast, light winds
D2	1m below surface	0491590	5445695	19/03/19	10.34	18.80	1.0	7.55	46636	94.1	7.08	71	0.00	3.1	-	High tide at 10.15	Overcast
D2	1m below surface	0491590	5445695	18/06/19	1.10	12.10	1.0	8.00	38200	77.2	8.30	99	3.00	2.5	-	High tide at 1.00 pm	Drizzly, calm.
D2	1m below surface	0491590	5445695	12/09/19	11.10	11.80	1.0	7.81	33953	81.7	8.85	114	0.80	2.7	Drift	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D2	1m below surface	0491590	5445695	09/12/19	9.40	15.40	1.0	8.08	41899	78.5	7.85	120	0.70	3.0	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D2*	1m below surface	0491590	5445695	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D2	1m above seafloor	0491590	5445695	28/09/16	10.30	13.43	3.5	8.03	21315	102.4	8.89	56	1.62	3.5	Light green, nil odour	High tide	Fine, clear skies.
D2	1m above seafloor	0491590	5445695	12/12/16	10.00	16.44	2.3	7.95	40162	92.9	7.56	442	0.66	3.3	Green, lots of filamentous weed	High tide	Cloudy
D2	1m above seafloor	0491590	5445695	08/03/17	9.28	19.63	2.0	8.04	54723	92.4	6.71	545	1.26	3.0	Greenish	Full tide at 8.30 am	
D2	1m above seafloor	0491590	5445695	06/06/17	10.15	13.43	2.0	8.18	42615	89.5	7.56		0.49	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D2	1m above seafloor	0491590	5445695	20/09/17	10.58	11.42	2.0	8.08	35285	104.2	9.41	1066	0.39	3.0	-	Cloudy, full tide @ 10am	Cloudy.
D2	1m above seafloor	0491590	5445695	13/12/17	9.00	18.52	2.0	7.96	46195	97.8	7.42	1027	1.36	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D2	1m above seafloor	0491590	5445695	13/03/18	9.25	19.89	2.0	8.09	51944	98.8	7.38	472	0.70	3.0	-	High tide at 9.00 am	
D2	1m above seafloor	0491590	5445695	25/06/18	10.38	11.42	2.0	8.19	35864	93.2	8.49	479	1.59	3.0	Clear, nil odour.	High tide at 9.10 am	Fine.
D2	1m above seafloor	0491590	5445695	24/09/18	11.03	12.10	2.0	8.22	33400	100.6	8.88	109	0.00	2.0	-	High tide at 10.30	Sunny, with light southeast breeze
D2	1m above seafloor	0491590	5445695	18/12/18	10.38	19.00	1.3	8.07	40151	87.1	6.85	46	1.00	2.3	-	High tide at 9.30	Overcast, light winds
D2	1m above seafloor	0491590	5445695	19/03/19	10.42	18.80	2.1	7.56	46680	91.0	6.88	61	0.00	3.1	-	High tide at 10.15	Overcast
D2	1m above seafloor	0491590	5445695	18/06/19	1.25	12.30	1.5	8.01	38310	78.0	8.35	96	3.00	2.5	-	High tide at 1.00 pm	Drizzly, calm.
D2	1m above seafloor	0491590	5445695	12/09/19	11.21	11.90	1.7	7.85	33771	82.4	8.91	112	0.80	2.7	Rough	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D2	1m above seafloor	0491590	5445695	09/12/19	10.00	15.20	2.0	8.13	42183	76.5	7.68	120	0.80	3.0	DUP01	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D2*	1m above seafloor	0491590	5445695	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

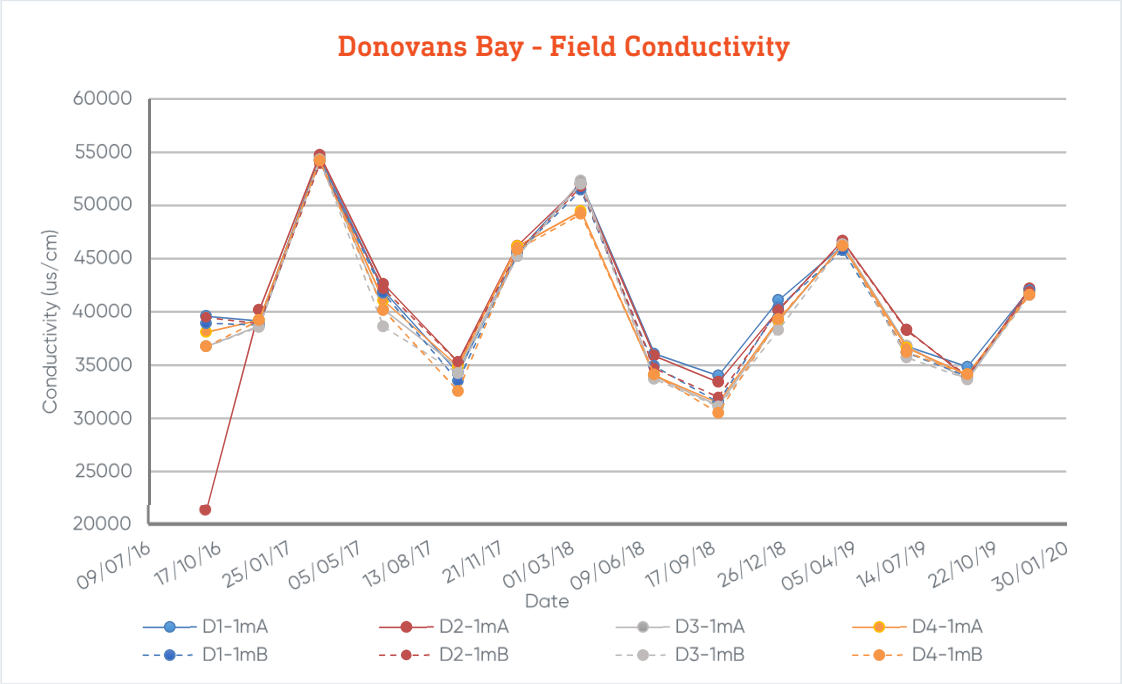
Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D3	1m below surface	0492915	5444140	28/09/16	10.40	13.68	1.0	7.79	36735	104.5	8.81	71	2.24	2.9	Light green, nil odour	High tide	Fine, clear skies.
D3	1m below surface	0492915	5444140	12/12/16	10.40	17.12	1.0	7.98	38551	93.6	7.61	415	0.97	3.5	Green, no algae	High tide	Cloudy
D3	1m below surface	0492915	5444140	08/03/17	9.50	19.52	1.0	8.04	54302	92.3	6.72	521	1.42	3.0	Greenish	Full tide at 8.30 am	
D3	1m below surface	0492915	5444140	06/06/17	10.30	12.68	1.0	8.14	38607	87.2	7.63		0.84	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D3	1m below surface	0492915	5444140	20/09/17	11.15	11.38	1.0	8.12	34225	105.5	9.60	1057	0.39	3.0	-	Full tide @ 10am	Cloudy.
D3	1m below surface	0492915	5444140	13/12/17	9.19	19.37	1.0	7.97	45225	97.6	7.35	1026	0.67	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D3	1m below surface	0492915	5444140	13/03/18	9.45	19.73	1.0	8.09	51999	99.0	7.45	459	2.50	3.0	-	High tide at 9.00 am	DUP01
D3	1m below surface	0492915	5444140	25/06/18	11.01	10.95	1.0	8.16	33679	95.3	8.87	415	1.10	2.9	Clear, nil odour	High tide at 9.10 am	Fine.
D3	1m below surface	0492915	5444140	24/09/18	11.19	12.20	1.0	8.14	31100	89.8	8.18	119	0.00	3.2	-	High tide at 10.30	Sunny, with light southeast breeze
D3	1m below surface	0492915	5444140	18/12/18	10.55	19.20	1.0	8.07	38287	85.7	6.64	70	1.00	3.9	-	High tide at 9.30	Overcast, light winds
D3	1m below surface	0492915	5444140	19/03/19	10.59	18.90	1.0	7.54	46326	92.4	6.92	72	0.00	3.2	-	High tide at 10.15	Overcast
D3	1m below surface	0492915	5444140	18/06/19	11.40	11.90	1.0	7.60	35700	78.8	8.53	57	4.50	4.0	-	High tide at 1.00 pm	Drizzly, calm.
D3	1m below surface	0492915	5444140	12/09/19	11.38	11.80	1.0	7.91	33702	85.0	9.21	109	0.90	3.0	-	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D3	1m below surface	0492915	5444140	09/12/19	9.30	15.50	1.0	8.04	41571	76.5	7.83	115	0.50	4.0	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D3*	1m below surface	0492915	5444140	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

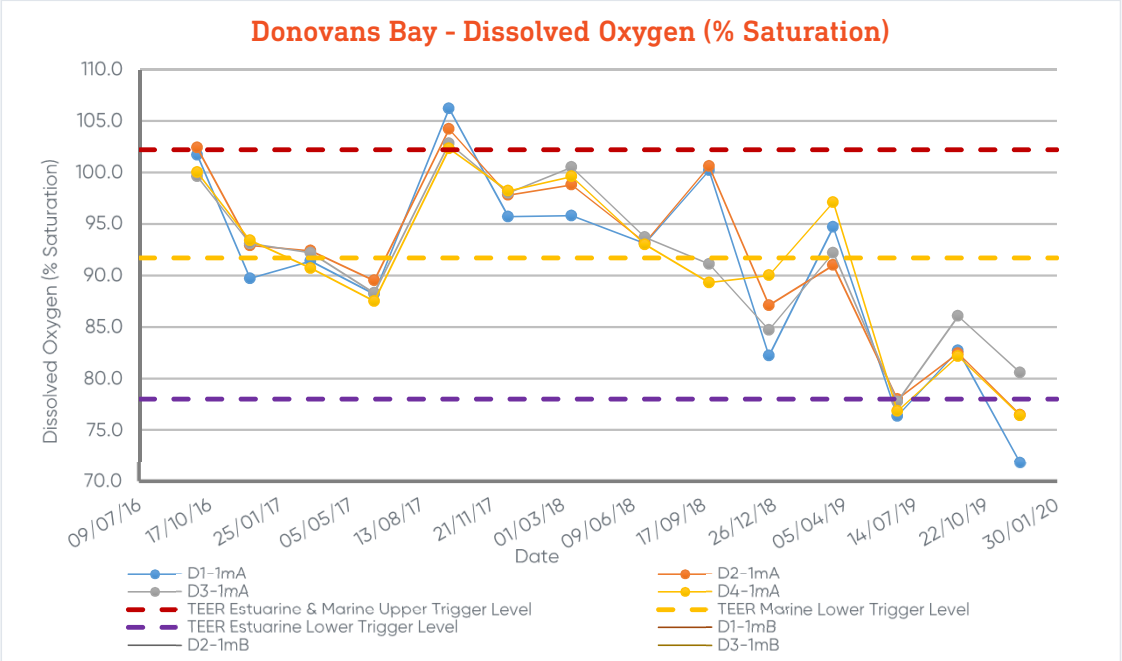
Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D3	1m above seafloor	0492915	5444140	28/09/16	10.50	13.45	1.9	7.91	36735	99.6	8.67	81	1.70	2.9	Light green, nil odour	High tide	Fine, clear skies.
D3	1m above seafloor	0492915	5444140	12/12/16	10.43	16.98	2.5	7.98	38677	93.1	7.51	454	0.72	3.5	Green, no algae	High tide	Cloudy
D3	1m above seafloor	0492915	5444140	08/03/17	10.05	19.69	2.0	8.04	54290	92.2	6.70	522	1.38	3.0	Greenish	Full tide at 8.30 am	
D3	1m above seafloor	0492915	5444140	06/06/17	10.46	12.97	2.0	8.19	40208	88.3	7.61		0.65	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D3	1m above seafloor	0492915	5444140	20/09/17	11.24	11.38	2.0	8.05	34731	102.8	9.32	1057	0.88	3.0	-	Full tide @ 10am	Cloudy.
D3	1m above seafloor	0492915	5444140	13/12/17	9.30	19.51	2.0	7.97	45196	98.0	7.37	1033	0.28	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D3	1m above seafloor	0492915	5444140	13/03/18	10.04	19.88	2.0	8.11	52321	100.5	7.50	480	11.70	3.0	-	High tide at 9.00 am	High turbidity reading at 1mA is accurate. No turbidity comment recorded in field notes. Potentially due to instrument variability.
D3	1m above seafloor	0492915	5444140	25/06/18	11.02	11.00	1.9	8.17	33934	93.7	8.70	482	1.11	2.9	Clear, nil odour	High tide at 9.10 am	Fine.
D3	1m above seafloor	0492915	5444140	24/09/18	11.25	12.10	2.2	8.13	31200	91.1	8.33	114	0.00	3.2	-	High tide at 10.30	Sunny, with light southeast breeze
D3	1m above seafloor	0492915	5444140	18/12/18	10.58	19.20	2.9	8.07	39093	84.7	6.74	63	1.00	3.9	-	High tide at 9.30	Overcast, light winds
D3	1m above seafloor	0492915	5444140	19/03/19	11.06	18.80	2.2	7.60	46398	92.2	6.93	63	0.00	3.2	-	High tide at 10.15	Overcast
D3	1m above seafloor	0492915	5444140	18/06/19	11.50	11.90	3.0	7.70	36800	77.7	8.40	50	5.20	4.0	-	High tide at 1.00 pm	Drizzly, calm.
D3	1m above seafloor	0492915	5444140	12/09/19	11.46	11.90	2.0	7.93	33607	86.1	9.30	108	0.80	3.0	-	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D3	1m above seafloor	0492915	5444140	09/12/19	9.20	15.50	3.0	8.03	41808	80.6	8.09	114	0.70	4.0	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D3*	1m above seafloor	0492915	5444140	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

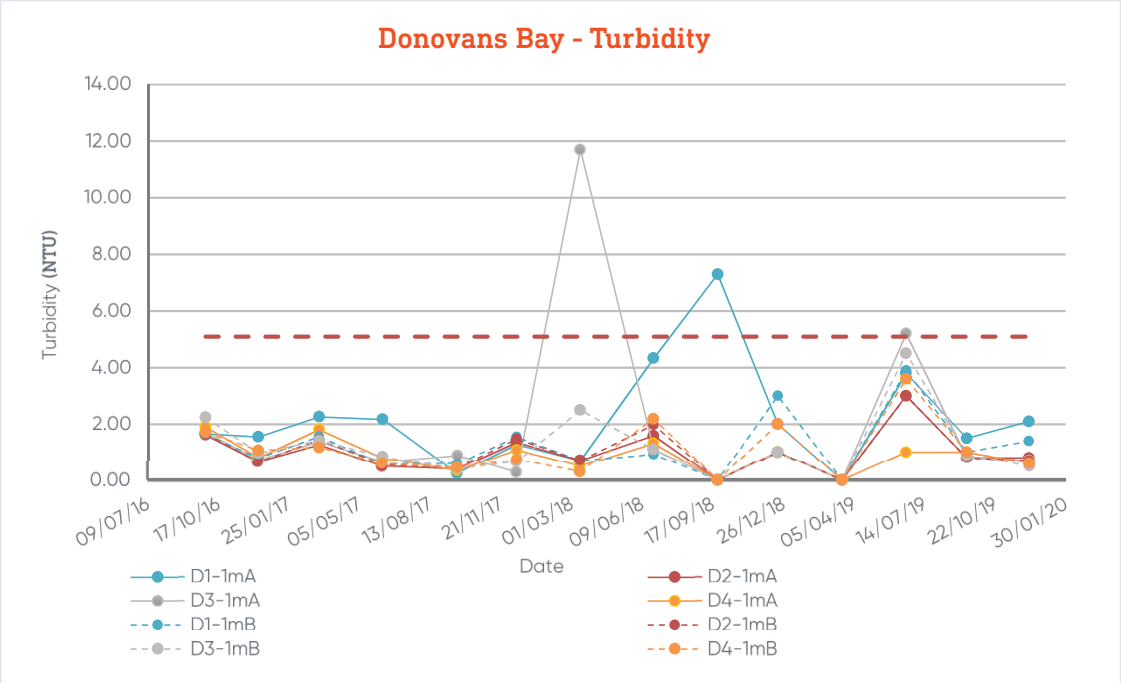
Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D4	1m below surface	0491625	5443715	28/09/16	11.10	13.67	1.0	7.88	36735	99.7	8.68	81	1.71	4.0	Light green, nil odour	High tide	Fine, clear skies.
D4	1m below surface	0491625	5443715	12/12/16	11.08	17.07	1.0	7.99	39197	92.9	7.51	397	1.07	3.0	Green	High tide	Cloudy
D4	1m below surface	0491625	5443715	08/03/17	10.29	19.68	1.0	8.01	54219	90.0	6.55	542	1.17	3.0	Greenish	Full tide at 8.30	
D4	1m below surface	0491625	5443715	06/06/17	11.00	13.04	1.0	8.18	40153	87.0	7.49		0.60	3.0	Greenish	Full tide	Cloudy. Problem with the probe, unable to collect ORP data.
D4	1m below surface	0491625	5443715	20/09/17	11.40	11.47	1.0	8.11	32534	105.0	9.64	996	0.44	3.0	-	Full tide @ 10am	Cloudy.
D4	1m below surface	0491625	5443715	13/12/17	9.49	19.46	1.0	7.95	45848	97.6	7.32	1033	0.73	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D4	1m below surface	0491625	5443715	13/03/18	10.10	19.73	1.0	8.10	49184	99.1	7.42	471	0.30	3.1	-	High tide at 9.00 am	
D4	1m below surface	0491625	5443715	25/06/18	11.19	11.05	1.0	8.16	34105	93.1	8.63	440	2.19	3.0	Clear, nil odour	High tide at 9.10 am	Fine.
D4	1m below surface	0491625	5443715	24/09/18	11.37	12.00	1.0	8.14	30500	96.9	8.76	126	0.00	2.9	-	High tide at 10.30	Sunny, with light southeast breeze
D4	1m below surface	0491625	5443715	18/12/18	11.14	19.20	1.0	8.07	39315	91.7	7.15	67	2.00	3.2	-	High tide at 9.30	Overcast, light winds
D4	1m below surface	0491625	5443715	19/03/19	11.17	18.90	1.0	7.61	46198	97.3	7.34	68	0.00	3.1	-	High tide at 10.15	Overcast
D4	1m below surface	0491625	5443715	18/06/19	12.15	11.80	1.0	8.00	36200	76.9	8.33	91	3.60	4.0	-	High tide at 1.00 pm	Drizzly, calm. DUP01
D4	1m below surface	0491625	5443715	12/09/19	12.11	11.80	1.0	7.90	34121	82.1	8.98	107	1.00	3.5	Drifting	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D4	1m below surface	0491625	5443715	09/12/19	8.55	15.40	1.0	8.01	41575	77.9	7.71	110	0.60	4.0	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D4*	1m below surface	0491625	5443715	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

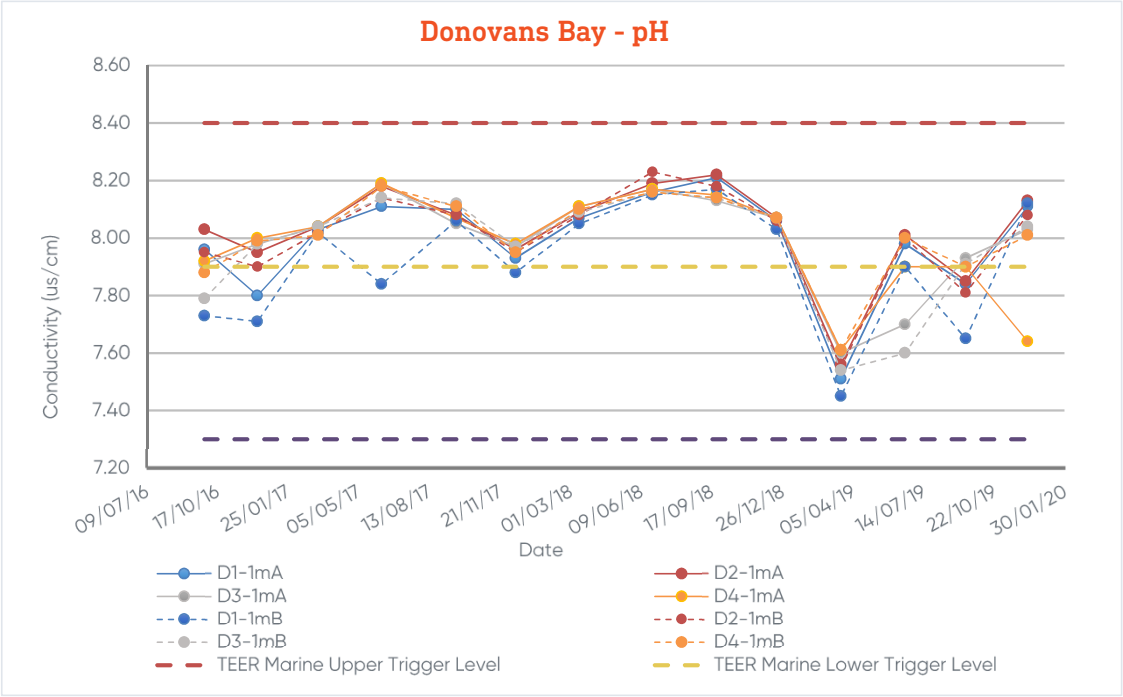
Location	Description	Easting	Northing	Date	Time	Temp (°C)	Depth (m)	pH	Cond (µS/cm)	DO (sat)	DO (mg/L)	ORP (mV)	Turb (NTU)	Sea floor at ...(m)	Field Observations/Notes	Level of Tide	Explanation of Data
D4	1m above seafloor	0491625	5443715	28/09/16	11.20	13.67	3.0	7.92	38095	100.0	8.73	38	1.90	4.0	Light green, nil odour	High tide	Fine, clear skies.
D4	1m above seafloor	0491625	5443715	12/12/16	11.11	16.71	2.0	8.00	39223	93.4	7.66	349	0.80	3.0	Green	High tide	Cloudy
D4	1m above seafloor	0491625	5443715	08/03/17	10.40	19.71	2.0	8.04	54219	90.7	6.59	554	1.81	3.0	Greenish	Full tide at 8.30 am	
D4	1m above seafloor	0491625	5443715	06/06/17	11.12	13.26	2.0	8.19	41060	87.5	7.48		0.79	3.0	Greenish	Full tide	Problem with the probe, unable to collect ORP data.
D4	1m above seafloor	0491625	5443715	20/09/17	11.48	11.29	2.0	8.07	34881	102.3	9.29	1045	0.34	3.0	-	Full tide @ 10am	Cloudy.
D4	1m above seafloor	0491625	5443715	13/12/17	9.59	19.10	2.0	7.98	46155	98.2	7.39	1023	1.08	3.0	-	High tide at 8.05am.	Problem with ORP calibration.
D4	1m above seafloor	0491625	5443715	13/03/18	10.30	19.95	2.6	8.11	49452	99.6	7.43	450	0.50	3.6	-	High tide at 9.00 am	
D4	1m above seafloor	0491625	5443715	25/06/18	11.20	11.13	2.0	8.17	34030	93.0	8.61	522	1.31	3.0	Clear, nil odour	High tide at 9.10 am	Fine.
D4	1m above seafloor	0491625	5443715	24/09/18	11.41	12.00	1.9	8.15	31450	89.3	8.18	119	0.00	2.9	-	High tide at 10.30	Sunny, with light southeast breeze
D4	1m above seafloor	0491625	5443715	18/12/18	11.18	19.20	2.2	8.07	39223	90.0	7.05	63	1.00	3.2	-	High tide at 9.30	Overcast, light winds
D4	1m above seafloor	0491625	5443715	19/03/19	11.25	18.90	2.1	7.61	46238	97.1	7.36	60	0.00	3.1	-	High tide at 10.15	Overcast
D4	1m above seafloor	0491625	5443715	18/06/19	12.30	11.90	3.0	7.90	36615	76.8	8.30	93	1.00	4.0	-	High tide at 1.00 pm	Drizzly, calm
D4	1m above seafloor	0491625	5443715	12/09/19	12.21	11.80	2.7	7.90	34088	82.2	8.90	105	1.00	3.7	-	High tide at 10.30 am	Windy and overcast. No rain. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D4	1m above seafloor	0491625	5443715	09/12/19	9.05	15.40	3.0	7.64	41809	76.4	7.64	111	0.60	4.0	-	High tide at 9.20 am	Calm and overcast. Lab turbidity conducted, as no field turbidity was recorded. No field DO recorded, so DO saturated was calculated from DO mg/L.
D4*	1m above seafloor	0491625	5443715	24/03/20													The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues (boat hire)

Conversion Notes: EC- Converted from mS to uS by multiplying by 10000. 44.52mS = 44520.
O2 converted from %Sat to mg/L by mulitplying by a factor derived from a salinity/temperature matrix.


Donovans Bay - Field Conductivity
Conductivity (us/cm)
60000
55000
50000
45000
40000
35000
30000
25000
20000
09/07/16
17/10/16
25/01/17
05/05/17
13/08/17
21/11/17
01/03/18
09/06/18
17/09/18
26/12/18
05/04/19
14/07/19
22/10/19
30/01/20
Date
D1-1mA
D2-1mA
D3-1mA
D4-1mA
D1-1mB
D2-1mB
D3-1mB
D4-1mB


Donovans Bay - Dissolved Oxygen (% Saturation)
Dissolved Oxygen (% Saturation)
110.0
105.0
100.0
95.0
90.0
85.0
80.0
75.0
70.0
09/07/16
17/10/16
25/01/17
05/05/17
13/08/17
21/11/17
01/03/18
09/06/18
17/09/18
26/12/18
05/04/19
14/07/19
22/10/19
30/01/20
Date
D1-1mA
D2-1mA
D3-1mA
D4-1mA
TEER Estuarine & Marine Upper Trigger Level
TEER Marine Lower Trigger Level
TEER Estuarine Lower Trigger Level
D1-1mB
D2-1mB
D3-1mB


Donovans Bay - Turbidity
Turbidity (NTU)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
09/07/16
17/10/16
25/01/17
05/05/17
13/08/17
21/11/17
01/03/18
09/06/18
17/09/18
26/12/18
05/04/19
14/07/19
22/10/19
30/01/20
Date
D1-1mA
D2-1mA
D3-1mA
D4-1mA
D1-1mB
D2-1mB
D3-1mB
D4-1mB


Donovans Bay - pH
Conductivity (us/cm)
8.60
8.40
8.20
8.00
7.80
7.60
7.40
7.20
09/07/16
17/10/16
25/01/17
05/05/17
13/08/17
21/11/17
01/03/18
09/06/18
17/09/18
26/12/18
05/04/19
14/07/19
22/10/19
30/01/20
Date
D1-1mA
D2-1mA
D3-1mA
D4-1mA
D1-1mB
D2-1mB
D3-1mB
D4-1mB
TEER Marine Upper Trigger Level
TEER Marine Lower Trigger Level

Donovans Bay Water Quality (Quarterly) Monitoring Test Results
AETV Power - Tamar Valley Power Station, Bell Bay

* No sample collected
** The 24/03/2020 monitoring event was postponed due to COVID-19 logistical issues

Site D1 - 1m below surface

Bold if above average for the month

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20**	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.12	0.04	0.02	0.09	0.05	0.02	0.09	0.03	0.04	**0.15**	**0.09**	0.05	**0.14**	<0.01	0.02		0.08	0.02	0.22
Nitrite + Nitrate as N (mg/L)	mg/L	0.26	<0.01	0.01	<0.01	**0.08**	0.03	0.04	<0.01	0.06	0.05	<0.01	<0.01	0.06	0.03	<0.01		0.06	0.01	0.26
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.2	<0.1	1	0.6	0.4	0.1	0.3	<0.1	0.4	**0.7**	0.10	0.30	0.40	0.10	<0.1		0.35	0.1	1
Total Nitrogen as N (mg/L)	mg/L	0.5	0.1	1	0.6	**0.5**	0.1	0.3	<0.1	0.5	**0.8**	0.10	0.30	**0.50**	0.10	<0.1		0.39	0.1	1
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.41	0.14	0.03	0.23	0.06	0.11	0.13	0.2	0.06	0.05	**0.22**	0.11	0.12	0.12		0.13	0.01	0.46
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	0.1	<1	<1	1	<1	<1	<1	<1	<1		1.01	0.1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D1 - 1m above base (sampled for June 2020 only)

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.07	0.05	0.02	0.09	0.05	0.03	**0.48**	0.06	0.04	0.06	0.10	0.05	0.09	<0.01	0.02		0.09	0.02	0.48
Nitrite + Nitrate as N (mg/L)	mg/L	0.26	0.23	0.01	<0	0.04	0.02	0.03	<0.01	0.06	0.03	<0.01	<0.01	0.05	0.05	<0.01		0.06	0.01	0.26
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.2	<0.1	<0.1	0.7	**0.4**	**0.4**	**0.8**	<0.1	0.3	**0.5**	0.30	**0.80**	<0.10	0.20	0.50		0.40	0.1	0.8
Total Nitrogen as N (mg/L)	mg/L	0.5	0.2	<0.1	0.7	0.4	0.4	**0.8**	<0.1	0.4	**0.5**	0.30	**0.80**	<0.10	0.20	0.50		0.42	0.1	0.8
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.4	0.56	0.04	0.18	0.07	0.12	0.10	0.17	0.11	0.05	0.12	0.12	0.12	**0.18**		0.16	0.04	0.56
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1		1.13	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D2 - 1m below surface

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.08	0.05	0.02	0.11	0.03	0.03	0.06	0.05	0.06	0.05	**0.09**	<0.01	0.07	<0.01	0.1		0.08	0.02	0.17
Nitrite + Nitrate as N (mg/L)	mg/L	0.27	0.06	0.04	<0.01	0.04	0.02	0.04	<0.01	0.06	0.06	0.01	<0.01	0.05	0.04	<0.01		0.06	0.01	0.27
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.2	<0.1	0.6	0.4	**0.8**	**0.5**	<0.1	<0.1	0.2	<0.1	**0.50**	0.30	<0.10	0.20	0.10		0.36	0.1	1.1
Total Nitrogen as N (mg/L)	mg/L	0.5	<0.1	0.6	0.4	**0.8**	**0.5**	<0.1	<0.1	0.3	<0.1	**0.50**	0.30	<0.10	0.20	0.10		0.41	0.1	1.1
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.4	0.25	0.03	0.29	0.06	0.16	0.13	0.23	**0.2**	0.07	0.15	0.14	0.15	0.14		0.17	0.02	0.46
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1		1.43	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D2 - 1m above sea floor

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.08	0.02	0.02	0.1	0.02	0.05	0.08	0.05	0.05	0.05	**0.10**	0.04	0.08	**0.08**	0.03		0.07	0.02	0.13
Nitrite + Nitrate as N (mg/L)	mg/L	0.24	0.02	0.02	<0.01	0.05	0.01	0.02	<0.01	0.06	0.04	0.01	0.02	0.04	0.04	<0.01		0.05	0.01	0.24
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.3	<0.1	1.1	0.4	0.4	**0.5**	0.1	<0.1	0.1	0.2	0.40	0.40	<0.10	<0.1	<0.1		0.37	0.1	1.1
Total Nitrogen as N (mg/L)	mg/L	0.5	<0.1	1.1	0.4	0.4	**0.5**	0.1	<0.1	0.2	0.2	0.40	0.40	<0.10	<0.1	0.40		0.39	0.1	1.1
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.41	0.32	0.02	**0.16**	0.09	0.19	0.13	0.2	0.13	0.06	**0.20**	**0.14**	**0.20**	0.13		0.14	0.02	0.41
Chlorophyll *a (mg/m3)*	mg/m3		<1	1	<1	<1	<1	1	<1	<1	<1	1	<1	<1	<1	<1		1.57	1	2
Total Trihalomethanes (THM) (ug/L)			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D3 - 1m below surface

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.09	0.03	0.03	0.1	0.07	0.05	0.05	0.06	0.05	0.1	0.08	0.04	**0.08**	<0.01	0.02		0.07	0.02	0.17
Nitrite + Nitrate as N (mg/L)	mg/L	0.3	0.04	0.02	<0.01	0.09	0.03	0.03	<0.01	0.07	0.04	0.03	<0.01	0.05	0.04	<0.01		0.07	0.01	0.3
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	<0.1	<0.1	1.1	0.8	<0.1	0.5	0.6	<0.1	0.4	0.1	0.20	<0.1	<0.10	<0.1	<0.1		0.44	0.1	1.1
Total Nitrogen as N (mg/L)	mg/L	0.3	<0.1	1.1	0.8	<0.1	**0.5**	0.6	<0.1	0.5	0.1	0.20	<0.1	<0.10	<0.1	<0.1		0.44	0.1	1.1
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.33	0.29	0.03	**0.2**	0.09	0.19	0.10	0.22	0.10	0.04	**0.16**	0.12	0.14	0.12		0.13	0.02	0.42
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1		1.14	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D3 - 1m above sea floor

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.09	0.02	0.02	0.09	**0.09**	0.04	0.06	0.06	0.03	0.05	**0.13**	0.03	0.08	<0.01	0.01		0.07	0.01	0.2
Nitrite + Nitrate as N (mg/L)	mg/L	<0.01	0.03	0.02	<0.01	**0.06**	0.02	0.03	<0.01	0.07	0.04	0.01	<0.01	0.06	0.04	<0.01		0.05	0.01	0.12
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.36	<0.1	0.6	0.6	<0.1	**0.6**	0.2	<0.1	0.4	0.2	**1.00**	**0.90**	<0.10	0.20	0.30		0.44	0.1	1
Total Nitrogen as N (mg/L)	mg/L	0.4	<0.1	0.6	0.6	<0.1	**0.6**	0.2	<0.1	0.5	0.2	**1.00**	**0.90**	<0.10	0.20	0.30		0.46	0.1	1
Total Phosphorus as P (mg/L)	mg/L	0.7	0.34	0.29	0.02	**0.22**	0.1	0.09	0.13	0.27	0.15	0.04	0.10	0.11	**0.18**	0.13		0.16	0.02	0.7
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1		1.42	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

Site D4 - 1m below surface

Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.09	0.08	0.02	0.09	0.04	0.05	0.06	0.06	0.03	0.04	**0.10**	0.03	**0.11**	0.02	0.02		0.07	0.02	0.22
Nitrite + Nitrate as N (mg/L)	mg/L	0.3	0.12	0.01	<0.01	0.08	0.02	0.02	<0.01	0.07	0.06	<0.01	<0.01	0.06	0.05	<0.01		0.07	0.01	0.3
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	<0.1	<0.1	1.1	0.5	<0.1	0.3	<0.1	<0.1	0.1	<0.1	**0.40**	<0.1	0.20	<0.1	0.10		0.33	0.1	1.1
Total Nitrogen as N (mg/L)	mg/L	0.3	0.1	1.1	0.5	<0.1	0.3	<0.1	<0.1	0.2	<0.1	**0.40**	<0.1	0.30	<0.1	0.10		0.33	0.1	1.1
Total Phosphorus as P (mg/L)	mg/L	<0.01	0.14	0.25	0.02	**0.26**	0.05	0.18	0.06	0.23	0.08	0.04	**0.25**	0.13	**0.15**	0.09		0.13	0.02	0.46
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	1	<1	<1	<1	<1	1	<1	<1	<1		1.44	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

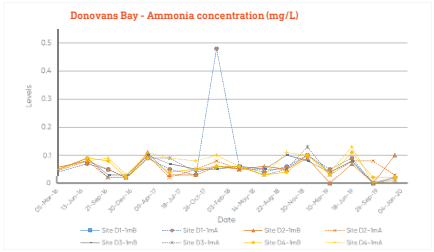
Site D4 - 1m above sea floor

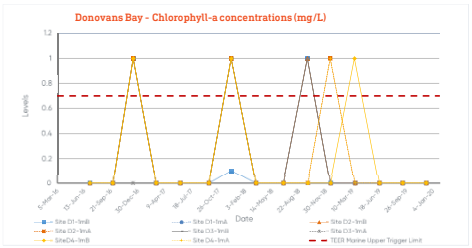
Compound	Unit	4-Jul-16	28-Sep-16	12-Dec-16	8-Mar-17	6-Jun-17	20-Sep-17	13-Dec-17	15-Mar-18	25-Jun-18	24-Sep-18	18-Dec-18	19-Mar-19	18-Jun-19	12-Sep-19	9-Dec-19	24-Mar-20	Updated Monthly Average	Minimum Result	Maximum Result
Ammonia as N (mg/L)	mg/L	0.08	0.09	0.03	0.11	**0.09**	**0.08**	0.1	0.06	0.03	**0.11**	**0.10**	0.04	**0.13**	<0.0.1	0.01		0.07	0.01	0.13
Nitrite + Nitrate as N (mg/L)	mg/L	<0.01	0.09	0.01	<0.01	0.05	0.03	0.02	<0.01	0.07	**0.08**	<0.01	<0.01	0.05	0.03	<0.01		0.05	0.01	0.1
Total Kjeldahl Nitrogen as N (TKN) (mg/L)	mg/L	0.33	<0.1	1.4	0.6	0.3	**0.7**	0.1	0.2	0.3	0.4	**0.80**	0.20	0.50	0.10	0.20		0.46	0.1	1.4
Total Nitrogen as N (mg/L)	mg/L	0.2	<0.1	1.4	0.6	0.4	**0.7**	0.1	0.2	0.4	0.5	**0.80**	0.20	**0.60**	0.10	0.20		0.46	0.1	1.4
Total Phosphorus as P (mg/L)	mg/L	0.5	0.16	0.24	0.02	**0.20**	0.18	0.17	0.13	0.15	0.07	0.08	**1.58**	0.10	0.14	0.10		0.20	0.01	1.58
Chlorophyll *a (mg/m3)*	mg/m3	<1	<1	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1		1.38	1	2
Total Trihalomethanes (THM) (ug/L)		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5

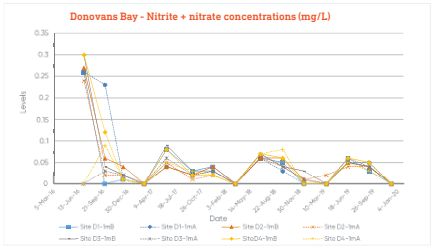
LEGEND:

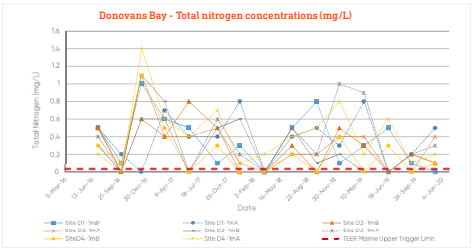
	Awaiting information: Samples submitted to laboratory awaiting analysis results).
	Result requiring investigation, or showing notable variation.
Bold	Result is bolded when above average.

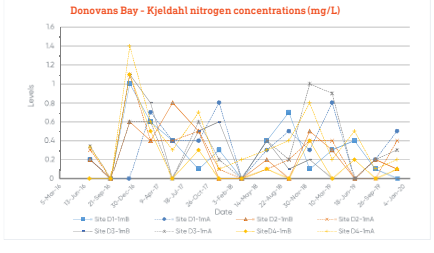
Donovans Bay Analysis Results Graphs from the 2015/16 AER onwards

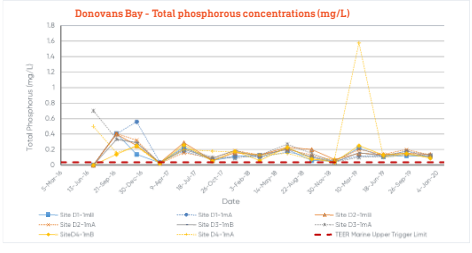












APPENDIX G6

Monthly near shore (voluntary) water quality results 2019/20

Near Shore & In-Line Water Quality (Monthly) Monitoring Test Results

AETV Power - Tamar Valley Power Station, Bell Bay

Environmental Protection Notice (EPN) No.7898/1

Project No. 2946.002, 2946.011, 2946.013, 2946.016, 2946.018, 2946.019 (Older data has been hidden to minimise the number of pages viewed)

Parameter	Unit	Date	Inline WWRP meter	90 FLMV Water Quality Meter (Measured at WWRP outflow Pt)	M1	M2	M3 (By WWRP flume)	M4 (Control, Big Bay)
pH		21/01/2019	7.74	7.88	8.06	8.06	8.02	8.06
dissolved O2	%	21/01/2019	101.00	90.00	92.00	89.00	92.60	93.50
oxygen	ppm	21/01/2019	-	-	-	-	-	-
temp	degrees C	21/01/2019	24.10	22.60	21.40	21.40	21.30	22.10
ORP	mV	21/01/2019	-	-	99.8	108.5	117.8	112.5
comments	Incoming tide, Unit 201 in lay-up.							
				Outfall probes : 7.87 pH, 86.00 DO, 21.1 deg. C, 25.7 mS/cm conductivity				
pH		21/02/2019	7.71	7.76	8.09	8.11	8.05	8.09
dissolved O2	%	21/02/2019	100.70	84.00	85.00	87.70	88.50	91.50
oxygen	ppm	21/02/2019	-	-	-	-	-	-
temp	degrees C	21/02/2019	20.50	20.00	19.80	20.00	18.70	17.70
ORP	mV	21/02/2019	-	-	149	158	150	164
comments	Incoming tide. River slightly turbid due to wind on the surface. A new inline monitor (SWAN AMI SAC254) has been installed on WWRP outfall to measure UV absorption as a surrogate for dissolved organics and enable better in-house management of pH and DO_2 during time so flow flow.							
				Outfall probes : 8.0 pH, 92.8 DO, 19.6 deg. C, 9.24 mS/cm conductivity				
pH		12/03/2019	7.80	8.29	7.97	7.99	8.03	7.90
dissolved O2	%	12/03/2019	101.00	81.70	84.00	84.70	85.70	88.90
oxygen	ppm	12/03/2019	-	-	-	-	-	-
temp	degrees C	12/03/2019	17.69	17.70	18.20	17.90	17.70	18.10
ORP	mV	12/03/2019	-	-	122	121	122	154
comments	Outgoing tide. Unit 201 came offline on 11th March 2019. System being drained to return to dry lay-up conditions.							
				Outfall probes : 7.83 pH, 90.50 DO, 18.73 deg. C, 18.7 mS/cm conductivity				
pH		3/04/2019	7.62	7.92	8.01	8.01	7.93	8.02
dissolved O2	%	3/04/2019	104.76	93.50	83.00	87.60	83.90	86.50
oxygen	ppm	3/04/2019	-	-	-	-	-	-
temp	degrees C	3/04/2019	16.40	16.60	17.10	17.10	17.30	17.10
ORP	mV	3/04/2019	-	-	90.8	91.0	90.0	97.5
comments	Unit 201 offline. Incoming tide, almost high tide. Very calm day.							
				Outfall probes : 7.84 pH, 90.9 DO, 17.5 deg. C, 30.4 mS/cm conductivity				
pH		28/05/2019	8.23	8.27	8.16	8.23	8.27	8.28
dissolved O2	%	28/05/2019	98.39	96.10	101.40	107.70	**112.60**	105.60
oxygen	ppm	28/05/2019	-	-	-	-	-	-
temp	degrees C	28/05/2019	11.60	11.20	11.10	10.50	11.10	11.50
ORP	mV	28/05/2019	-	-	104.0	93.5	92.6	104.0
comments	Unit 201 offline.							
				Outfall probes : 7.84 pH, 95.99 DO, 11.4 deg. C, 25.86 mS/cm conductivity				
pH		19/06/2019	7.30	7.90	7.84	7.87	7.80	7.74
dissolved O2	%	19/06/2019	99.80	90.20	85.00	93.10	92.80	89.90
oxygen	ppm	19/06/2019	-	-	-	-	-	-
temp	degrees C	19/06/2019	9.40	9.80	10.90	11.10	10.80	10.90
ORP	mV	19/06/2019	-	-	395.0	376.0	457.0	175.0
comments	Unit 201 offline. River very calm, incoming tide							
				Outfall probes : 7.7 pH, 88.4 DO, 11.2 deg. C, 26.5 mS/cm conductivity				
pH		25/07/2019	7.06	7.80	7.92	7.94	7.89	7.89
dissolved O2	%	25/07/2019	100.44	86.80	90.20	91.50	**100.20**	91.30
oxygen	ppm	25/07/2019	-	-	-	-	-	-
temp	degrees C	25/07/2019	10.05	10.40	10.30	10.30	10.10	10.50
ORP	mV	25/07/2019	-	-	95.6	92.8	120.0	101.5
comments	Unit 201 offline. River water coloured (could be tannins), didn't appear cloudy. Outgoing tide.							
				Outfall probes : 7.7 pH, 96.0 DO, 10.59 deg. C, 19.9 mS/cm conductivity				
pH		22/08/2019	7.51	7.77	7.92	8.05	8.10	7.90
dissolved O2	%	22/08/2019	103.00	94.70	87.20	**100.40**	**101.90**	95.70
oxygen	ppm	22/08/2019	-	-	-	-	-	-
temp	degrees C	22/08/2019	10.10	9.90	9.30	9.20	7.20	8.50
ORP	mV	22/08/2019	-	-	87.9	89.0	86.8	105.0
comments	Unit 201 offline. River quite turbid due to recent rain. Outgoing tide.							
				Outfall probes : 7.90 pH, 93.1 DO, 9.9 deg. C, 27.1 mS/cm conductivity				
pH		19/09/2019			8.05	8.09	8.24	8.16
dissolved O2	%	19/09/2019			**111.50**	**109.00**	**116.00**	**117.00**
oxygen	ppm	19/09/2019	-	-	-	-	-	-
temp	degrees C	19/09/2019			12.50	12.90	12.60	12.40
ORP	mV	19/09/2019	-	-				
comments	Sampled at low tide due to logistics issues. Maintenance outage on water treatment plant, whole station outage. No flow through WWRP, so no discharge sample could be collected.							
						Outfall probes: No discharge to test		
pH		16/10/2019	9.26		7.89	8.04	8.09	7.98
dissolved O2	%	16/10/2019	132.00		91.40	92.00	101.60	105.10
oxygen	ppm	16/10/2019	-	-	-	-	-	-
temp	degrees C	16/10/2019	16.20		14.60	14.40	14.20	14.10
ORP	mV	16/10/2019	-	-	**627.0**	**551.0**	**492.0**	176.0
comments	Unit 201 offline. No discharge as WWRP outlet closed for sodium hypochlorite dosing to rectify high DO.							
						Outfall probes: No discharge to test		
pH		12/11/2019	7.92	7.58	7.90	7.96	7.75	7.78

AETV Power - Tamar Valley Power Station
Ambient, Near-Shore Water Quality Monitoring (Locations M1 to M4)

Parameter	Unit	Date	Inline WWRP meter	90 FLMV Water Quality Meter (Measured at WWRP outflow Pt)	M1	M2	M3 (By WWRP flume)	M4 (Control, Big Bay)
dissolved O2	%	12/11/2019	100.36	93.30	113.50	114.00	114.00	119.00
oxygen	ppm	12/11/2019	-	-	-	-	-	-
temp	degrees C	12/11/2019	16.05	15.10	14.50	14.60	14.70	15.40
ORP	mV	12/11/2019	-	-	139.0	145.0	145.0	135.0
comments	Unit 201 offline. Very windy, river rough and turbid.							
				Outfall probes: 7.92 pH, 94.8 DO, 15.0 deg. C, 38.4 mS/cm conductivity				
pH		3/12/2019	8.15	7.87	7.95	7.92	7.80	7.91
dissolved O2	%	3/12/2019	97.18	97.90	91.40	92.60	102.70	92.50
oxygen	ppm	3/12/2019	-	-	-	-	-	-
temp	degrees C	3/12/2019	15.90	15.70	14.70	14.40	12.40	**16.60**
ORP	mV	3/12/2019	-	-	149.0	149.0	148.0	**137.0**
comments	Unit 201 offline. Pond outlet valves had been closed for several days before sampling to treat algal growth within the pond. Outlet valve reopened at 7.57 am (prior to sampling at 8.20). Very windy, river rough and turbid.							
				Outfall probes: 7.87 pH, 97.14 DO, 14.6 deg. C, 39.24 mS/cm conductivity				
pH		13/01/2020	8.48	8.27	7.99	7.99	7.90	8.02
dissolved O2	%	13/01/2020	109.32	97.70	93.90	94.90	**100.70**	98.30
oxygen	ppm	13/01/2020	-	-	-	-	-	-
temp	degrees C	13/01/2020	22.15	21.40	21.20	20.60	20.40	22.30
ORP	mV	13/01/2020	-	-	126.0	132.0	133.0	127.0
comments	Unit 201 offline. In coming tide (flow). Weather clear and still.							
				Outfall probes: 7.88 pH, 98.50 DO, 19.9 deg. C, 42.37 mS/cm conductivity				
pH		11/02/2020	8.60	7.38	7.91	7.95	7.76	7.95
dissolved O2	%	11/02/2020	110.00	90.10	87.00	88.50	86.70	96.00
oxygen	ppm	11/02/2020	-	-	-	-	-	-
temp	degrees C	11/02/2020	19.90	20.00	19.30	19.40	18.90	20.50
ORP	mV	11/02/2020	-	-	104.0	117.0	109.0	117.0
comments	Unit 201 offline. WWRP closed after sampling due to high DO and pH and pond was dosed with sodium hypochlorite. Discharge flow has been low due to inoperation of peaking plant. Incoming tide (flow)							
				Outfall probes: 7.9 pH, 82.9 DO, 18.3 deg. C, 47.5 mS/cm conductivity				
pH		18/03/2020	7.38	8.17	7.98	7.99	8.05	7.93
dissolved O2	%	18/03/2020	98.70	96.00	100.40	98.70	103.40	111.40
oxygen	ppm	18/03/2020	-	-	-	-	-	-
temp	degrees C	18/03/2020	18.89	19.10	18.50	18.50	**18.80**	18.60
ORP	mV	18/03/2020	-	-	89.7	91.1	90.0	117.0
comments	Unit 201 offline. Light rain at time of sampling.							
				Outfall probes: 8.07 pH, 97.0 DO, 18.7 deg. C, 19.5 mS/cm conductivity				
pH		/04/2020						
dissolved O2	%	/04/2020						
oxygen	ppm	/04/2020	-	-	-	-	-	-
temp	degrees C	/04/2020						
ORP	mV	/04/2020	-	-				
comments	Unit 201 offline. Light rain at time of sampling.							
				Outfall probes: pH, DO, deg. C, mS/cm conductivity				

LEGEND:

	Mitsubishi in standby mode (lay-up) - Cooling tower not in operation, decreased WWRP discharge. No monitoring required to be undertaken.
	Potential probe or user error - low water quality meter readings.
	Awaiting information from AETV.
	Analysis results for discharge at DP1 are outside of the prescribed DO range, or higher than typical results for this parameter.
	Note: The DO recorded at control location M4 is elevated and/or above the result recorded by the inline WWRP and/or background.
	Whole station outage. No WWRP discharge, so no sample collected for testing.
Bold	Results recorded at M1 to M4 is outside of 80-100% saturation range for DO suggesting possible aeration or deterioration of water quality within DB.

Near Shore Ambient Water Quality (Monthly) Monitoring Test Results

AETV Power - Tamar Valley Power Station, Bell Bay

Location	East	North	Rationale	Description
M1	491719	5445882	Donovans Bay monitoring	Sampled from <0.5m depth
M2	491660	5445795	Donovans Bay monitoring	Sampled from <0.5m depth
M3 (closest to Discharge)	491713	5445711	Donovans Bay monitoring	Sampled from <0.5m depth
M4	492082	5445297	Control site at Big Bay	Sampled from <0.5m depth

Analyte	Units	Date	M1	M2	M3 (By WWRP DP1)	M4 (Control)	Comments	Sampler
Ammonia-nitrogen	mg/L	3/04/2019	0.11	0.06	0.09	0.11		KS/PF
Chlorophyll-a	mg/m3	3/04/2019	1	1	1	1		KS/PF
Total Phosphorus	mg/L	3/04/2019	**0.32**	0.22	0.22	0.23	TP at M1 higher than other sites within DB and M4 (Background). No rain for 3 days prior to sampling, so is more likely to be associated with accumulation of TP in the shallows rather than a catchment input.	KS/PF
Total Nitrogen	mg/L	3/04/2019	0.40	0.80	0.60	0.80		KS/PF
Ammonia-nitrogen	mg/L	28/05/2019	0.05	0.03	**0.08**	0.07	M3 slightly higher than M4 (background).	KS/PF
Chlorophyll-a	mg/m3	28/05/2019	<1	<1	<1	1		KS/PF
Total Phosphorus	mg/L	28/05/2019	0.16	0.01	0.15	0.16		KS/PF
Total Nitrogen	mg/L	28/05/2019	<0.1	<0.1	<0.1	<0.1		KS/PF
Ammonia-nitrogen	mg/L	19/06/2019	0.09	0.09	0.06	0.09	Levels were elevated, but correlated with that at background.	KS/PF
Chlorophyll-a	mg/m3	19/06/2019	<1	<1	**2**	<1	Level at M3 (near DP1 outfall) is above level recorded at background and other sites, suggests influence of DP1.	KS/PF
Total Phosphorus	mg/L	19/06/2019	0.02	0.02	0.03	0.15		KS/PF
Total Nitrogen	mg/L	19/06/2019	<0.1	<0.1	0.10	0.20		KS/PF
Ammonia-nitrogen	mg/L	25/07/2019	<0.01	<0.01	0.01	<0.01		KS/PF
Chlorophyll-a	mg/m3	25/07/2019	<1	<1	<1	<1		KS/PF
Total Phosphorus	mg/L	25/07/2019	0.05	0.02	0.04	0.06		KS/PF
Total Nitrogen	mg/L	25/07/2019	0.20	0.30	0.10	0.30		KS/PF
Ammonia-nitrogen	mg/L	22/08/2019	0.03	0.02	0.01	0.02		KS/PF
Chlorophyll-a	mg/m3	22/08/2019	<1	<1	<1	<1		KS/PF
Total Phosphorus	mg/L	22/08/2019	0.02	0.04	0.03	0.05		KS/PF
Total Nitrogen	mg/L	22/08/2019	0.40	0.60	0.30	<0.1	Levels in DB above background, but M3 result below other locations within the bay so unlikely impact	KS/PF
Ammonia-nitrogen	mg/L	19/09/2019	0.04	0.05	0.04	0.02		KS/PF
Chlorophyll-a	mg/m3	19/09/2019	<1	<1	<1	<1		KS/PF
Total Phosphorus	mg/L	19/09/2019	<0.05	<0.05	<0.05	<0.05		KS/PF
Total Nitrogen	mg/L	19/09/2019	<0.5	<0.5	<0.5	<0.5		KS/PF
Ammonia-nitrogen	mg/L	16/10/2019	**0.18**	**0.07**	0.04	0.05	Levels at M1 and M2 were above M4 background	KS/PF
Chlorophyll-a	mg/m3	16/10/2019	**2**	**1**	<1	<1	Levels at M1 and M2 were above M4 background	KS/PF
Total Phosphorus	mg/L	16/10/2019	**0.09**	**0.10**	0.07	0.07	Levels at M1 and M2 were above M4 background	KS/PF
Total Nitrogen	mg/L	16/10/2019	**0.40**	0.10	0.20	0.30	Levels at M1 was above M4 background	KS/PF
Ammonia-nitrogen	mg/L	12/11/2019	0.04	0.03	0.04	0.04		KS/PF
Chlorophyll-a	mg/m3	12/11/2019	1	<1	2	2	Levels at M3 same as backgrounded, but noted to be at higher level than recorded at other locations within DB	KS/PF
Total Phosphorus	mg/L	12/11/2019	0.08	0.06	**0.11**	0.09	Level at M3 is above that of background and other sites	KS/PF
Total Nitrogen	mg/L	12/11/2019	0.20	0.10	0.20	0.20		KS/PF
Ammonia-nitrogen	mg/L	3/12/2019	0.04	0.07	**0.14**	0.06	The level at M3 was above M4 background and other sites within DB.	KS/PF
Chlorophyll-a	mg/m3	3/12/2019	1	<1	<1	4	Notably higher nutrient levels at M4 Control.	KS/PF
Total Phosphorus	mg/L	3/12/2019	0.09	0.07	0.08	0.27	Notably higher nutrient levels at M4 Control.	KS/PF
Total Nitrogen	mg/L	3/12/2019	0.50	0.40	0.20	1.60	Notably higher nutrient levels at M4 Control.	KS/PF
Ammonia-nitrogen	mg/L	13/01/2020	0.04	0.04	0.06	0.07		KS/PF
Chlorophyll-a	mg/m3	13/01/2020	**1**	**1**	**1**	<1	Levels at all sites	KS/PF
Total Phosphorus	mg/L	13/01/2020	**0.11**	0.08	**0.10**	0.08	Level at M1 and M3 are above background	KS/PF
Total Nitrogen	mg/L	13/01/2020	0.30	0.30	0.20	0.70		KS/PF
Ammonia-nitrogen	mg/L	11/02/2020	0.05	0.04	**0.1**	0.01	Levels within DB are above background levels. Likely localised influence of DP1 discharge measured at M3.	KS/PF
Chlorophyll-a	mg/m3	11/02/2020	<1	<1	<1	1		KS/PF
Total Phosphorus	mg/L	11/02/2020	0.05	0.03	0.06	0.08		KS/PF
Total Nitrogen	mg/L	11/02/2020	0.30	0.20	0.40	0.70		KS/PF
Ammonia-nitrogen	mg/L	18/03/2020	**0.1**	0.08	**0.1**	0.09	Levels at M1 and M3 are just above background, but comparable.	KS/PF
Chlorophyll-a	mg/m3	18/03/2020	<1	<1	<1	1		KS/PF
Total Phosphorus	mg/L	18/03/2020	**0.04**	**0.03**	0.02	0.02	Accumulation of TP within the bay at levels slightly above background, but comporable.	KS/PF
Total Nitrogen	mg/L	18/03/2020	**0.80**	**0.40**	**0.40**	0.20	Potential accumulation within the bay, particularly at M1. Ebb (outgoing) tide.	KS/PF

LEGEND:

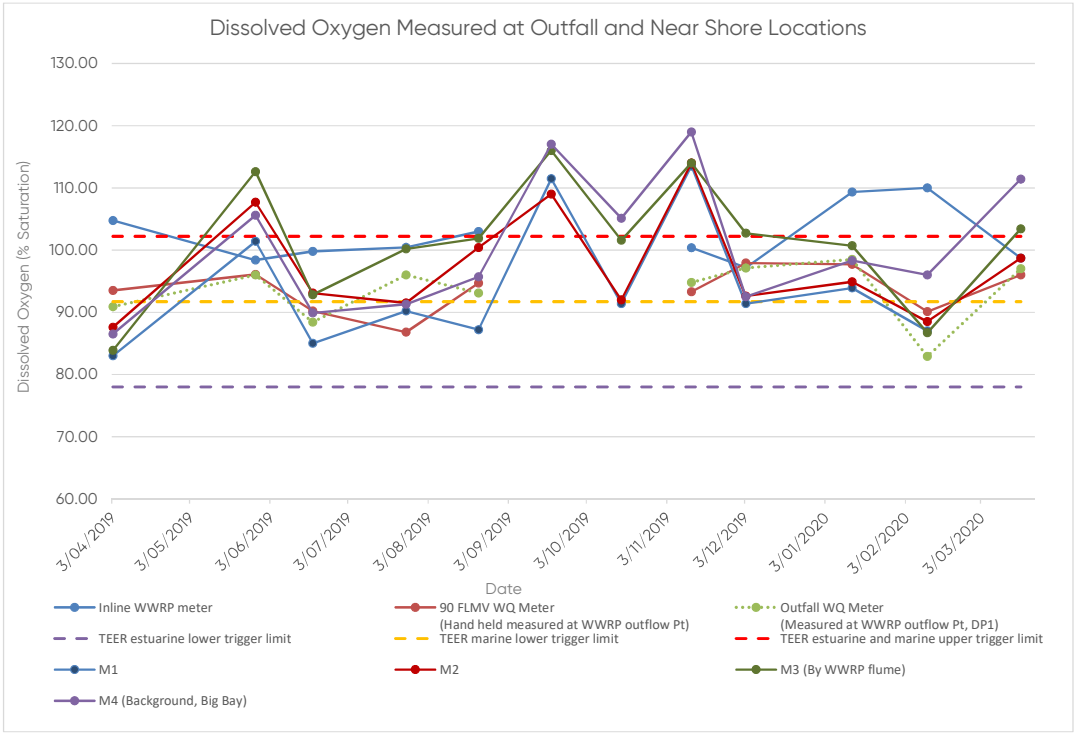
	Mitsubishi in standby mode (lay-up) - Cooling tower not in operation, decreased WWRP discharge.
Bold	Analysis results are above background levels (M4), or higher than typical results for this parameter.
	Results for discussion

Near Shore & In-Line Dissolved Oxygen Levels (Monthly) Monitoring Test Results

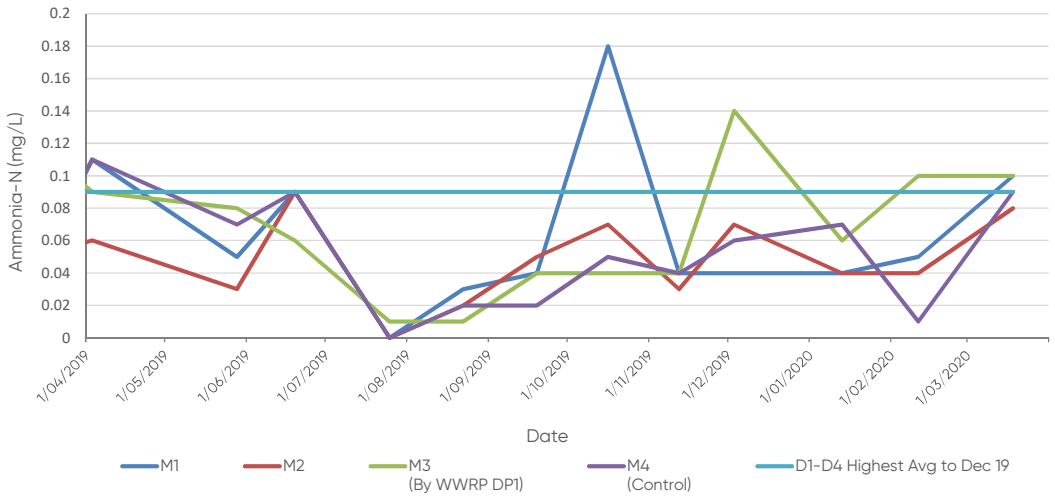
Date	Inline WWRP meter	90 FLMV WQ Meter (Hand held measured at WWRP outflow Pt)	Outfall WQ Meter (Measured at WWRP outflow Pt, DP1)	TEER estuarine lower trigger limit	TEER marine lower trigger limit	TEER estuarine and marine upper trigger limit	M1	M2	M3 (By WWRP flume)	M4 (Background, Big Bay)	Comments
3/04/2019	104.76	93.50	90.90	78	91.7	102.2	83.00	87.60	83.90	86.50	Incoming tide, almost high tide. Very calm day.
28/05/2019	98.39	96.10	95.99	78	91.7	102.2	**101.40**	**107.70**	**112.60**	105.60	
19/06/2019	99.80	90.20	88.40	78	91.7	102.2	85.00	93.10	92.80	89.90	River very calm, incoming tide.
25/07/2019	100.44	86.80	96.00	78	91.7	102.2	90.20	91.50	**100.20**	91.30	River water coloured (could be tannins), didn't appear cloudy. Outgoing tide.
22/08/2019	103.00	94.70	93.10	78	91.7	102.2	87.20	**100.40**	**101.90**	95.70	River quite turbid due to recent rain. Likely environmental influence on DO. Outgoing tide.
19/09/2019				78	91.7	102.2	111.50	**109.00**	**116.00**	117.00	Samples at low tide, no WWRP discharge to test.
16/10/2019				78	91.7	102.2	91.40	92.00	101.60	105.10	No WWRP discharge
12/11/2019	100.36	93.30	94.80	78	91.7	102.2	113.50	114.00	114.00	119.00	Very windy, river rough and turbid
3/12/2019	97.18	97.90	97.14	78	91.7	102.2	91.40	92.60	**102.70**	92.50	Very windy, river rough and turbid.
13/01/2020	109.32	97.70	98.50	78	91.7	102.2	93.90	94.90	100.70	98.30	Weather clear and still.
11/02/2020	110.00	90.10	82.90	78	91.7	102.2	87.00	88.50	86.70	96.00	
18/03/2020	98.70	96.00	97.00	78	91.7	102.2	100.40	98.70	103.40	111.40	Light rain at time of sampling. Outgoing tide. Unit 201 offline.
/04/2020											

LEGEND:

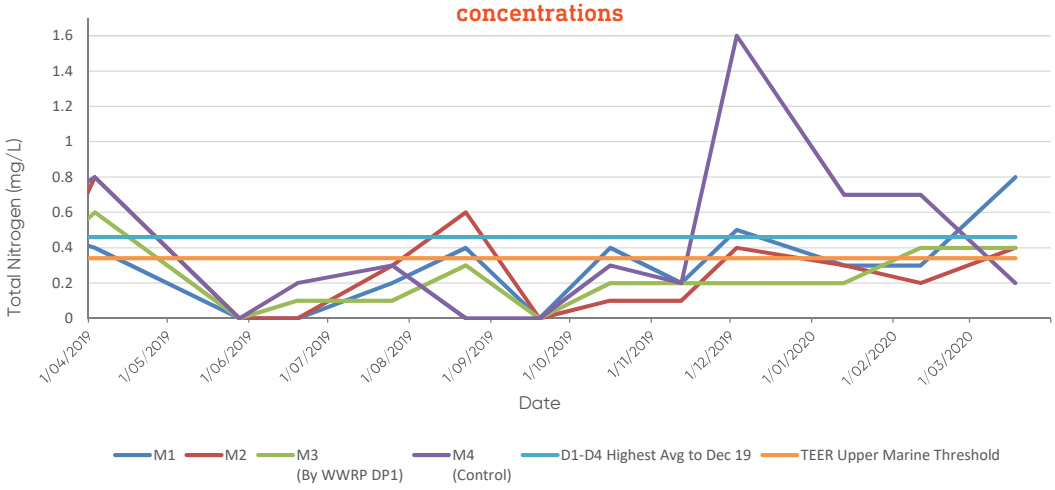
	Analysis results for discharge at DP1 are outside of the prescribed DO range, or higher than typical results for this parameter.
	Note: The DO recorded at control location M4 is elevated and/or above the result recorded by the inline WWRP and/or background.
BOLD	Results recorded at M1 to M4 is outside of 80-100% saturation range for DO suggesting possible deterioration of water quality within DB.
	Station shut in Spetember 2019 and WWRP refilling and/or no WWRP discharge to sample in October 2019



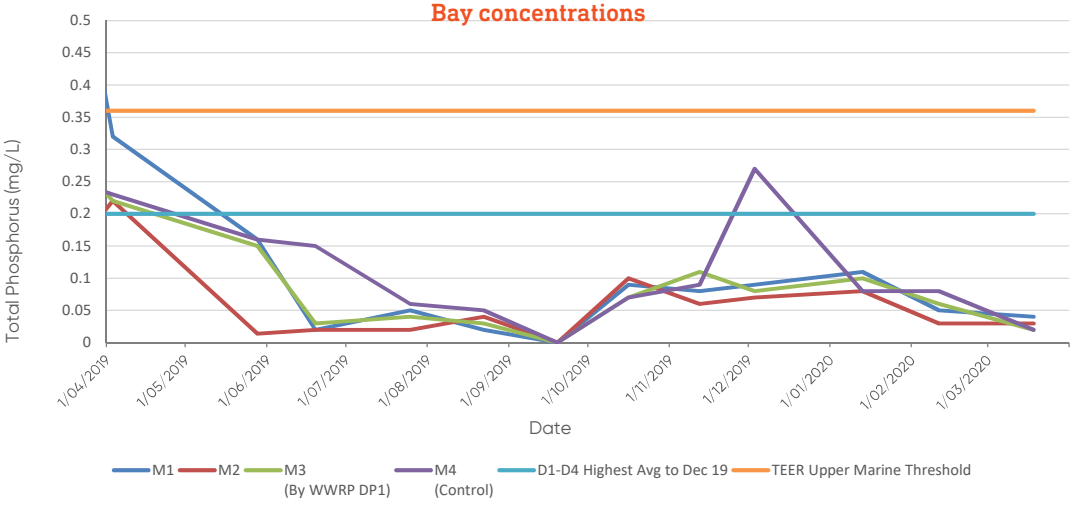
Near shore ambient ammonia-N concentrations compared to Donovans Bay concentrations



Near shore ambient total nitrogen concentrations compared to Donovans Bay concentrations



Near shore ambient total phosphorus concentrations compared to Donovans Bay concentrations



APPENDIX H

Tamar Valley Power Station, Bell Bay compliance audit April 2019 (EPA, May2019)

Level 2, Henty House, 1 Civic Square, Launceston TAS 7250
GPO Box 1550, Hobart, TAS 7001 Australia

Enquiries: Steve Windsor
Ph: +61 3 6777 2075
Email: Steve.Windsor@epa.tas.gov.au
Web: www.epa.tas.gov.au
Our Ref: EN-EM-PE-PX-110315_3 | M461137 ck

ENVIRONMENT PROTECTION AUTHORITY

31 May 2019

Ms Donna McDermott
Tamar Valley Power Station Manager (Acting)
Aurora Energy (Tamar Valley) Pty Ltd
4055 East Tamar Highway
GEORGE TOWN TAS 7253

Attention: Kathy Shanley – Chemical Technician

Dear Ms McDermott

TAMAR VALLEY POWER STATION, BELL BAY
COMPLIANCE AUDIT APRIL 2019

I refer to the compliance audit undertaken at Tamar Valley Power Station (TVPS) on 29 April 2019 by EPA Officer Steve Windsor. The audit was conducted against Permit No. DA 2007/072 as varied by Environment Protection Notice No. 7898/1. I acknowledge that you, Kathy Shanley and Catherine Ford were present on behalf of TVPS. Please find attached a copy of the audit report.

The level of compliance with the Permit was very high and AETV is to be commended for its environmental management across the site. The audit identified compliance with 34 out of 37 applicable conditions, three instances of minor non-compliance and seven conditions that were not applicable at the time of the audit.

Minor Non-Compliant – Emission Limits
Condition A2 (2) provides regulatory emission limits for nitrous oxides (NO_X) for each of the turbines when operating on natural gas or diesel. The audit identified that:

- There was one exceedance measured from Unit 102B Pratt Whitney turbine (Result 77 mg/m^3, limit 70 mg/m^3) during the scheduled March 2018 stack testing event.
- There was one exceedance measured from Unit 104 Rolls Royce Trent turbine (Result 62 mg/m^3, limit 60 mg/m^3) during the scheduled March 2019 stack testing event.

AETV acted swiftly, to take the turbines off-line, investigate and address the cause of the exceedances, and verify compliance prior to operational use. As such, no further action is required.

Minor Non-Compliant – Stack Testing Frequency
Condition A3 (1) requires stack tests for new gas turbines to be conducted within 2 months of commissioning and then quarterly thereafter unless approved by the Director. On 3 April 2014, AETV received approval from the Director to undertake stack testing of the TVCC power plant on a quarterly basis only during the period that it is producing power for export to the grid.

- In March 2019, the TVCC (Unit 201 Mitsubishi CCGT) was at short notice (outside the control of TVPS) put into dry lay-up just days before the scheduled end of March stack testing. The CCGT had been operating through most of the quarter since the December 2017 stack test.

I am advised that AETV has engaged a second stack emissions testing service provider which will improve the capability to undertake stack testing at short notice if unexpected start up or shut down occurs. I further understand that AETV has purchased a portable flue gas analyser that can measure nitrous oxide emissions for the purposes of conducting internal monitoring. Modifications have been

planned for next year's budget to allow internal monitoring from the ground where turbines currently require the hire of an elevated work platform to complete stack testing. As such, no further action is required.

Minor Non-Compliant – Emission Limits

Condition E1 (3) requires concentrations in discharged wastewater of certain substances to not exceed specified limits at specified discharge points.

- AETV reported occasional exceedances for biological oxygen demand (BOD), free chlorine, total phosphorous, ammonia and total suspended solids (TSS) from discharged wastewater at DP1. All but one exceedance occurred when the raw water source was from the (untreated) Curries River water supply over the summer months, when water from the treated Chimney Saddle supply becomes unavailable.

I am advised that the wastewater (DP1) discharge limits and design of the TVPS water treatment plant were based on a blended supply of treated and untreated water over the drier months, not for 100% untreated water from Curries River as supplied by TasWater over these periods. This water requires additional treatment to meet the plant water quality requirements which ultimately results in higher concentrations of contaminant loading reporting to the waste water retention pond (WWRP) and DP1. I note that AETV has installed CEMS monitoring for BOD at the WWRP discharge that will provide trending and trigger action should elevations occur. In addition, AETV is installing a boom around the WWRP inlet to reduce the discharge of TSS - the main cause of exceedances reported in the 2017-18 AER.

As part of the compliance audit, a review of AETV Power Pty Ltd Annual *Environment Review Report (Reporting Period 1st April 2017 to 31st March 2018) submitted 20 September 2018* was completed. I am advised that this document satisfies the requirements of Condition RP1 of the Permit. Of note is the monitoring performance against conditions, continued voluntary monthly sampling, action taken to reduce exceedances, reduction of waste to landfill and environmental management through commitment of budget to ongoing maintenance, and installation of improved CEMS instrumentation.

Should you have any queries about this matter, please contact Steve Windsor on the contact details at the head of this correspondence.

Yours sincerely

Cindy Ong
MANAGER, ENVIRONMENTAL OPERATIONS NORTH
Delegate for the Director, Environment Protection Authority

cc Kathy Shanley, Chemical Technician, AETV, *Kathy.Shanley@hydro.com.au*
cc Catherine Ford, Senior Environmental Scientist, COVA, 5/40 Molle Street Hobart TAS 7000 – email *Catherine.Ford@covathinking.com.au*

Audit Report: EPN 7898/1

Audit Date: 29/04/2019

Client: AETV PTY LTD

ACN/ABN: 123 391 613

Premises Name: TAMAR VALLEY POWER STATION

Production Limit: 77 tonnes per hour

Activity Type / Desc.: Fuel Burning / a gas fired power station

1.0 Summary Table

Total Number of Conditions Audited/Out of	**44/44**
Conditions Not Audited	
Compliant	**34**
Not Applicable	**7**
Limited Evidence / Unable to Verify	**0**
Minor - Non Compliant	**3**
Non Compliant	**0**

2.0 Audit Table

Condition Category / Condition Title	Notes	Level of Compliance
Q1: Regulatory limits	The 2017-18 AER states full compliance with the maximum quantity limits. Operation energy generating capacity has not increased since the May 2017 audit and the actual fuel consumption is less than half the regulatory limit. Daily and annual waste water discharge reported was 60% of the limits and no diesel was burnt for generation of electricity to the grid. Sighted monthly reports including the December 2018 report 'Chem-MR-12-2018' that collate supporting data extracted from SCADA.	Compliant
G1: Compliance with EMP and BPEM	Ms Donna McDermott stated that AETV has conducted a gap analysis of its EMS and is working towards compliance with the ISO 14001 Environmental Management System. The 2017-18 AER documents the implementation status of 2016-7 commitments	Compliant

	as well as new and ongoing commitments for 2018-19. Ms Kathy Shanley stated that AETV sets Environmental and Safety targets which drive workplace inspections encompassing hazardous material management. Sighted the overarching 'IMS-SI—A—EHS Environmental Imperatives' document.	
G2: Access to and awareness of conditions and associated documents	Sighted the EPN on the AETV 'Q Pulse' (DMS) documentation management system as well as the 'New Starter Induction Package' which includes environmental factors. Sighted a completed induction check list dated '9/4/2019'.	Compliant
G3: Incident response	No reportable incidents were reported in the 2017-18 AER nor have occurred in the current AETV reporting year. Incident response procedures, roles and responsibilities were sighted in the 'IMS-SI—A—EHS Environmental Imperatives' and '-EHS Environmental Management System' documents. Incidents would be recorded in the Hydro Event Management System as was sighted for the recent Rolls Royce Trent NOx exceedance incident '7712 TVPS – Stack testing N2O level above EPN'. Information sighted included incident details, risk, investigation, actions, action assignee and calculated risk level'.	Compliant
G4: No changes without approval	No change to activities has occurred since the May 2017 EPN Compliance Audit. AETV have a change management process documented within the sighted 'IMS-SO-A-EHS Corrective Action and Change Management Procedure. The TPL-Site A Change Form' which requires a hazard and risk assessment, review of statutory requirements and notification regulatory agencies.	Compliant
G5: Hazard Identification	Sighted the Hydro environment operations risk register 'HSER0306.4 Site Hazard Register 2019' which includes the probability/consequence risk rating, existing controls, additional controls and amended risk rating. Verified the hazard/ risk details for incorrect waste segregation listed in the AETV site specific 'Risk Register March 2018'. No high or severe environment risks were identified in the AETV Risk Register.	Compliant
G6: Complaints register	No community complaints have been received dating back to the May 2017 Audit. Sighted the 'Environmental Log 2009' log book , which did include a record of a noise query made from the EPA (Steve Windsor) in regard to a noise complaint concerning the general Bell Bay precinct. Sighted details of this query and response entry dated 15 April 2019 'ER00689' registered in the AETV 'Basix' event management platform fulfilling the requirements of the condition.	Compliant

A1: Stack testing facilities	Sighted the Ektimo NATA certified air emission test reports provided in the 2017-18 AER stating that the sampling plane for all stacks in operation are compliant with AS4323.1.	Compliant
A2: Emission limits	The majority of stack emission results are compliant, 20 stack tests were conducted in 2017-18 and a similar quantity of stack tests is likely to be reported in the 2018-19 AER. Two minor exceedances have been reported since the May 2017 EPN Compliance Audit. These include the Pratt & Whitney Unit 102B (Mar 2018) which measured 7 mg/m3 over the limit of 70 mg/m3 and the Rolls Royce Trent Unit 104 (Mar 2019) which measured 2 mg/m3 over the limit of 60 mg/m3. In both instances the turbines were taken off line immediately, whilst the cause of the exceedance was investigated and repaired. In the latter case EPA Approval was given to allow temporary operation until the Mitsubishi Unit 201 was scheduled to come on line April 20, 2019.	Minor - Non Compliant
A3: Stack Testing Frequency	Sighted the stack test reports for 2017-18 and the table of results documented in Appendix B and Section 2.9 of the 2017-18 AER. The Unit 104 Rolls Royce Trent turbine and the Pratt and Whitney turbines that were operating across the period had been sampled in accordance with the condition requirements. The scheduled end March 2018 sampling event for the Unit 201 Mitsubishi turbine was missed because it had been put into dry lay-up at limited notice just prior to the air emissions sampling campaign. Ektimo were unable to bring the stack testing forward. The Unit 201 Mitsubishi turbine had been operating most of February and between March 9 to 26, therefore sampling of the 201 was non-compliant for that quarter. It is acknowledged that given the erratic power demands placed on the operation from time to time and the inability to get a qualified service provider on site at short notice full compliance with this condition is challenging.	Minor - Non Compliant
A4: Emission limit exceedances	Both March 2018 and March 2019 exceedances for the Unit 102B Pratt and Whitney turbine and the Unit 104 Rolls Royce Trent turbine were reported on the same day as the stack test well within the 48 hour deadline.	Compliant
A5: Operation of Pratt and Whitney turbines	It was stated by Ms K Shanley as reported in the 2017-18 AER Section 2.9 that the Pratt and Whitney turbines are always run with water injection when generating power. Supporting records available through SCADA.	Compliant
DC1: Notification of cessation	Not triggered, Ms K Shanley aware of condition requirement.	N/A
DC2: DRP requirements	Not triggered, Ms K Shanley aware of condition requirement.	N/A

DC3: Rehabilitation following cessation	Not triggered, Ms K Shanley aware of condition requirement.	N/A
DC4: Temporary suspension of activity	Not triggered, Ms K Shanley aware of condition requirement.	N/A
DS1: Authorised Discharge Points	It was confirmed during the inspection there is no other discharge of waste water or storm water from site other than the nominated DP1 and DP2 authorised discharge points. There is intermittent minor seepage during periods of high inflow to the WWRP but not sufficient to cause a loss of containment from site. From investigation minor cracks within inlet stand pipes to the WWRP are the probable cause. Maintenance repairs are scheduled for the next major shut when all turbines are taken off-line.	Compliant
E1: Emission Limits	AETV reported exceedances for biological oxygen demand (BOD)(x2), free chlorine (x2), total phosphorous (x1), ammonia (x1) and total suspended solids (TSS)(x4) against the waste water emission limits discharged from DP1. All but one of the exceedances occurred when the raw water source was from the (untreated) Curries River water supply over the summer months, when water from the treated Chimney Saddle supply becomes unavailable. Ms K Shanley stated that AETV at the next major shut will empty the WWRP to anchor down a boom that should reduce the discharge of TSS from the WWRP. AETV have recently installed CEMS monitoring with telemetry back to the process control room for trending of total organics at the WWRP decant that will facilitate improved control of effluent discharged.	Minor - Non Compliant
E2: Stormwater Emission Limits	One exceedance was reported in the 2017-18 AER for total petroleum hydrocarbons (TPH) and BOD from the June 2017 sampling event. The sample was taken the day after a rainfall event following a prolonged dry period without discharge from the storm water settling pond. The AER states it is likely the exceedance occurred from stagnation and decay of natural organic matter. Ms K Shanley stated there has been no exceedances to date during the 2018-19 reporting year.	Compliant
E3: Stormwater	All storm water drains sighted through out the site inspection were tagged with identification numbers. All gutters, curbs and pits are concreted with direct run-off directed to storm water drains that report to a settling pond via a sediment collection pit that was sighted. The storm water drain and spill way from the settling pond that reports to Donovan Bay are adequately lined with rocks to prevent erosion. Ms K Shanley stated there is a scheduled monthly inspection program of the storm water drainage network to ensure it is adequately maintained. There was no flow of water across	Compliant

	the spillway at the time of the audit inspection	
E4: Discharge Water Temperature	The temperature of the WWRP discharged via the outfall DP1 is checked monthly against ambient receiving water at four sampling locations. The AER 2017-18 Section 2.13 shows that the temperature differential for all sampling events was within the +/- 7 degrees Celsius investigation level as required by the condition.	Compliant
H1: Spill kits	Numerous spill kits sighted around the plant for chemical and hydrocarbon spills. Ms K Shanley stated that an annual maintenance work order ensures that scheduled auditing of spill kits is implemented.	Compliant
H2: Storage and handling of hazardous materials	The standard of management and house keeping of hazardous materials storage and handling observed during the site inspection was excellent. All tanks and bunded areas have placarding and are tagged. There is either dedicated bunds, storage cabinets or transportable bunding arrangements for all substances. Bulk dangerous goods such as sodium hydroxide and sulphuric acid are stored in concreted bunds with pits with shut-off valves that can be opened to transfer any spillage or rainwater to the neutralisation tank. The transport and loading apron is also graded to a pit that can be pumped out to the neutralisation tank. AETV have an oil water separator that services the plant and the maintenance work shop. The main oil water separator is equipped with a high level alarm and CEMS ammonia detection capability with telemetry back to the process control room. Ms K Shanley stated that AETV conducted an internal audit of all bunds to ensure that containment volume is adequate for the required storage capacity.	Compliant
M1: Dealing with samples obtained for monitoring	The 2017-18 AER Table 19 states that all water quality sampling and analysis is undertaken in accordance with Australian Standards or NATA approved method except for free chlorine. EPA Approval was provided to AETV 2 July 2018 to conduct their own non-NATA accredited in-house analysis for free chlorine. The noise assessment reported by Tarkarri Engineering, 23 May 2018, Section 2.3 states compliance with the Tasmanian Noise Measurements Procedures Manual.	Compliant
M2: Location of Monitoring Points	Map of water quality monitoring locations documented in the AER 2017-18, Figure 2. There have been no changes to the monitoring locations post the last audit May 2017.	Compliant
M3: Wastewater Monitoring	Full compliance with waste water monitoring sampling in accordance with Condition M3 is supported through the comprehensive records and evaluation of data for continuous, daily and monthly sampling from DP1, documented	Compliant

	in the AER 2017-18, Section 2.12 and Appendix D.	
M4: Tamar River Monitoring	Condition not triggered. There has been no change to the waste water discharge point from DP1 into the Tamar River.	N/A
M5: Stormwater Monitoring	Full compliance with storm water monitoring frequency and testing of parameters in accordance with Condition M5 is supported through the comprehensive records and evaluation of data for quarterly sampling from DP2, documented in the AER 2017-18, Section 2.10 and Appendix C.	Compliant
M6: Donovans Bay Monitoring	Full compliance with the quarterly Donovans Bay water quality program at sample locations D1 to D4 in accordance with Condition M6 is supported through the comprehensive records and evaluation of data, documented in the AER 2017-18, Section 2.15 and Appendix D. The next triennial sampling event for In faunal assemblages is not due until 2020.	Compliant
M7: Eutrophication Monitoring	As per letter from the Director to Mr Ciffo 19 May 2015, Eutrophication Monitoring is no longer required.	N/A
N1: Operation Noise Emission Limits	A full environmental noise survey in March 2017 and an environmental assessment conducted at one noise sensitive premises in March 2018 by Tarkarri Engineering both state that AETV did not breach the noise limits at any of the noise sensitive premises.	Compliant
N2: Comprehensive Site-Wide Noise Survey	Condition not triggered since the may 2017 Audit.	N/A
N3: Record Of Noise Generating Activities	Sighted data recorded through SCADA including operating times of turbines. Ms K Shanley stated the BASIX platform records details of all maintenance activities and modifications. Process information can be extracted when required.	Compliant
N4: Noise Survey Requirements	A full noise survey was completed in March 2017 when the two largest MW generating turbines (Mitsubishi Unit 201 and the Rolls Royce Trent Unit 104) were operating. Due to reasons out side the control of AETV the plant went into shut down just prior to the scheduled 2018 noise survey. A day time noise survey at one noise sensitive premises with the Pratt & Whitney FT8 turbines operating only for purposes of stack testing was conducted.	Compliant
N5: Noise Survey Report Requirements	The 2017 noise survey report and the 2018 noise assessment were provided with the AERs for the respective reporting years. Both reports complied with the condition requirements.	Compliant
OP1: Contact Person	Sighted in the 'Proc-Site-A-EHS-Emergency Response Plan' included with the 2017-18 AER.	Compliant

OP2: Training and Competency	Sighted the 'TVPS - Site Induction -March 2018 v2.4' and a completed induction check list dated '9/4/2019'. Ms K Shanley that all employees have to repeat the induction program every two years. The training includes chemical and waste management; and spill prevention. Ms D McDermott stated that an environment gap assessment of AETV EMS against Hydro Standards had identified that the environment context within the induction program could be expanded. Sighted a gap closure action against Ms McDermott on the Hydro event management system.	Compliant
OP3: Emergency Response and Contingency Plan	The Emergency Response and Contingency Plan is reviewed annually and is submitted annually within the AER. Sighted the 'Proc-Site-A-EHS-Response to Emergency Scenarios, rev March 2017'' which is a 'ready guide and information source' for managing foreseeable emergencies at the AETV. This document prioritises threats in the following order human safety, community and environment, production and plant. It includes specific environmental emergencies including spillage of oil in water and on land, transformer oil leak and chemical spills. Each scenario includes first indications of emergency, possible causes, suggested actions on notification of incident, location of available equipment, key issues, key hazards, suggested action for clean-up including notification of EPA and completion of incident report.	Compliant
OP4: Fire Management Plan	Sighted the 'Proc-Site-A-EHS-Operational Fire Management Plan, Jan 2018' of which the first revision was approved in April 2011. The document states in the objectives that has been established to fulfil and implement the requirements of the planning permit DA 2007/072, relevant legislation and standards listed in pages 5-6. The document also includes details of potential hazards, fire prevention methods, infrastructure and land use, fire detection and response; maintenance, monitoring and reporting. AETV also maintain a live database through ChemAlert of it's dangerous substances.	Compliant
OP5: Plant and Equipment	Sighted the 'Proc-Site-A_EHS-Maintenance Management Procedure' which outlines the AETV methodology that under pins the Maintenance Management encompassing the full life cycle of assets. This includes agreements with Original Equipment Suppliers, use of the computerised BASIX platform to generate work orders and maintain records of all scheduled and completed maintenance activities, critical inspections, training plans, employee performance development, asset register and responsibilities of personnel. Major works are planned, budgeted and scheduled; the 2017-18 AER included the list of proposed maintenance for the 2018-19	Compliant

	reporting year. Ms D McDermott stated that life saving rules in the compliance management plan require employees to only conduct work where they are qualified or assessed as competent to do so .	
OP6: Flow Monitoring Equipment	Sighted flow monitoring equipment at the WWRP. Ms K Shanley stated that flow monitoring equipment is calibrated annually.	Compliant
OP7: Stormwater Management	Sighted perimeter cut-off drains to divert storm water from the East Tamar Valley Highway and from the former Bell Bay Power Plant into Donovans Bay. Adequately constructed storm water drains across the site were sighted and seen to be in good condition. Their was no visual signs of erosion, build up of sediment or unintended flow of water. Mrs K Shanley stated the sediment from the sighted sediment collection pit was removed in June 2018. Observations from the monthly site walks conducted concurrently with environmental monitoring of DP1 are recorded by way of field notes.	Compliant
OP8: Design and Maintenance of Settling Ponds	The storm water settling pond sighted contains a robust rock and aggregate spillway to prevent erosion. Ms K Shanley stated that the settling pond are inspected, and the weeds removed regularly.	Compliant
RP1: Annual Environmental Review	The AER for the April 2017- March 2018 reporting year was submitted 20 September 2018 following EPA approval 26 March 2018 for a permanent submission date of 30 September. The AER submitted was comprehensive, of high quality and met the requirements of this condition.	Compliant