



# Catherine Hill Bay Water Utility

## **Licence Plan Audit (Stage 1 – Interim Scheme)**

#14054-10-001 Version 2.0

Independent Pricing and Regulatory Tribunal

August 2017



## Document History

### Catherine Hill Bay Water Utility

Licence Plan Audit  
(Stage 1 – Interim Scheme)

### Independent Pricing and Regulatory Tribunal

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## Contents

<b>1. Executive Summary</b>	<b>1</b>
1.1 Auditor Declaration	1
1.2 Major Findings	1
1.3 Recommendations	1
<b>2. Introduction</b>	<b>2</b>
2.1 Objectives	2
2.2 Licensee's Infrastructure, Systems and Procedures	2
2.3 Audit Method	3
2.4 Regulatory Regime	5
2.5 Quality Assurance Process	5
2.6 Audit Findings	5
<b>3. Infrastructure Operating Plan</b>	<b>6</b>
3.1 Summary of Findings	6
3.2 Review of Actions	6
3.3 Opportunities for Improvement	6
<b>4. Water Quality Plan (Drinking Water)</b>	<b>7</b>
4.1 Summary of Findings	7
4.2 Review of Actions	7
4.3 Opportunities for Improvement	7
<b>5. Water Quality Plan (Non-potable Water)</b>	<b>8</b>
5.1 Summary of Findings	8
5.2 Review of Actions	8
5.3 Opportunities for Improvement	8
<b>6. Sewage Management Plan</b>	<b>9</b>
6.1 Summary of Findings	9
6.2 Review of Actions	9
6.3 Opportunities for Improvement	9

<b>Appendix A</b>	<b>Detailed Audit Findings – Infrastructure Operating Plan (IOP)</b>	<b>11</b>
Table A.1	IOP Audit Table – WIC Reg Sched 1 cl.6(1)(a) and/or cl.13(1)(a)	13
Table A.2	IOP Audit Table – WIC Reg Sched 1 cl.6(1)(b) and/or cl.13(1)(b)	18
Table A.3	IOP Audit Table – WIC Reg Sched 1 cl.6(1)(c) and/or cl.13(1)(c)	20
Table A.4	IOP Audit Table – WIC Reg Sched 1 cl.6(1)(d) and/or cl.13(1)(d)	24
Table A.5	IOP Audit Table – WIC Reg Sched 1 cl.6(1)(e) and/or cl.13(1)(e)	26
<b>Appendix B</b>	<b>Detailed Audit Findings – Water Quality Plan (Drinking Water) (WQP (dw))</b>	<b>29</b>
Table B.1	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 1	31
Table B.2	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 2	33
Table B.3	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 3	35
Table B.4	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 4	37
Table B.5	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 5	40
Table B.6	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 6	42
Table B.7	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 7	44
Table B.8	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 8	47
Table B.9	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 9	49
Table B.10	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 10	50
Table B.11	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 11	52
Table B.12	WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 12	54
<b>Appendix C</b>	<b>Detailed Audit Findings – Water Quality Plan (Non-potable Water) (WQP (npw))</b>	<b>55</b>
Table C.1	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 1	57
Table C.2	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 2	58
Table C.3	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 3	60
Table C.4	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 4	61
Table C.5	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 5	63
Table C.6	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 6	64
Table C.7	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 7	65
Table C.8	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 8	66
Table C.9	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 9	67
Table C.10	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 10	68
Table C.11	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 11	69
Table C.12	WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 12	70
<b>Appendix D</b>	<b>Detailed Audit Findings – Sewage Management Plan (SMP)</b>	<b>71</b>
Table D.1	SMP Audit Table – WIC Reg Sched 1 cl.14(1)(a)	73
Table D.2	SMP Audit Table – WIC Reg Sched 1 cl.14(1)(b)	78

# 1. Executive Summary

## 1.1 Auditor Declaration

This report presents the findings of a Licence Plan Audit of the compliance of Catherine Hill Bay Water Utility Pty Ltd's *Infrastructure Operating Plan*, *Drinking Water Quality Management Plan* and *Sewage Management Plan* with the relevant provisions of *Water Industry Competition Act 2006* and the *Water Industry Competition (General) Regulation 2008* as they relate to the drinking water, sewerage and recycled water schemes at Catherine Hill Bay.

The auditor confirms that:

- the auditor was provided with sufficient evidence on which to base the conclusions reached during the audit;
- the audit findings accurately reflect the professional opinion of the auditor;
- the auditor has conducted the audit, determined the audit findings and prepared this report in accordance with the requirements of the *WIC Act Audit Guidelines*<sup>1</sup> and the provisions of the Audit Deed; and
- the audit findings have not been unduly influenced by the Licensee and/or any of its associates and express the auditor's opinion as to whether the Licensee has met the Licence conditions and regulatory requirements as specified in the scope.

## 1.2 Major Findings

The Licensee, Catherine Hill Bay Water Utility Pty Ltd, was found to have documented the arrangements in relation to the design, construction, operation and maintenance of the proposed drinking water, sewerage and recycled water schemes in full compliance with the assessed audit criteria. No non-compliances were identified.

## 1.3 Recommendations

No recommendations have been made as a result of this audit.

Four (4) opportunities for improvement, which the Licensee may wish to consider, are identified in the body of the report.

## 1.4 Conclusion

In the opinion of the auditors, the Catherine Hill Bay Water management plans (*Infrastructure Operating Plan*, *Drinking Water Quality Management Plan* and *Sewage Management Plan*) adequately document the arrangements in relation to the design, construction, operation and maintenance of the Stage 1 (Interim Scheme) drinking water, sewerage and recycled (non-potable) water infrastructure to be operated under Network Operator's Licence No: 16\_035. The documented arrangements are adequately compliant with the relevant guidelines, standards and legislative requirements.

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<sup>1</sup> IPART, *Audit Guideline for Greenfield Schemes; Water Industry Competition Act 2006 (NSW)*, July 2013.

## 2. Introduction

### 2.1 Objectives

This report presents the findings of a Licence Plan Audit undertaken for the Independent Pricing and Regulatory Tribunal (IPART) under the provisions of the *Water Industry Competition Act 2006*.

The objective of the audit was to assess compliance of the Licensee, Catherine Hill Bay Water Utility Pty Ltd's (Catherine Hill Bay Water or CHBWU) Licence Plans (*Infrastructure Operating Plan*, *Drinking Water Quality Management Plan* and *Sewage Management Plan*) with the provisions of the relevant legislation (the *Water Industry Competition Act 2006* and *Water Industry Competition (General) Regulation 2008*) as they relate to the drinking water, sewerage and recycled water schemes currently at Catherine Hill Bay. These schemes will be operated pursuant to the conditions of Network Operator's Licence No: 16\_035.

It is noted that a separately reported New Infrastructure Audit<sup>2</sup> was conducted in conjunction with this audit.

### 2.2 Licensee's Infrastructure, Systems and Procedures

The infrastructure, systems and procedures subject to audit are those related to the drinking water, sewerage and recycled water schemes (the Schemes) that will service "The Beaches" land and housing development at Catherine Hill Bay, approximately 20 kilometres south of Newcastle (refer <http://www.solowater.com.au/schemes/>). The infrastructure (Stage 1 – Interim Scheme) will initially comprise:

- a potable (drinking) water network that will draw water from an existing bulk potable water supply, with an inline chlorine monitoring and dosing system;
- a pressure sewer collection network, together with an interim pump out tank (for disposal of sewage by road tanker); and
- a non-potable (recycled) water network that will initially be charged with potable water via a cross connection from the potable water supply located downstream of the chlorine dosing point.

A wastewater treatment plant is to be commissioned in approximately 12 months' time, following which:<sup>3</sup>

- sewage will be treated at the site to produce recycled water; and
- the non-potable water network will be charged with recycled water.

Catherine Hill Bay Water Utility Pty Ltd (ACN 163 381 922) is the Licensee, holding Network Operator's Licence No: 16\_035. As Licensee, Catherine Hill Bay Water will own and/or be responsible for the ongoing operation and maintenance of the drinking water network, sewerage network and the recycled water network (under the interim arrangements) in accordance with its Licence Plans including:

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<sup>2</sup> Cobbitty Consulting/Water Futures, *Catherine Hill Bay Water Utility; New Infrastructure Audit (Stage 1 – Interim Scheme) (Version 2.0)*, 16 August 2017.

<sup>3</sup> The proposed treatment plant is not included in the scope of this audit.



- Solo Water, *Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017;
- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017;
- Solo Water, *Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017; and
- other relevant supporting documentation.

It is noted that, a specific *Water Quality Plan (non-potable water)* has not been prepared for the purposes of the interim scheme.

## 2.3 Audit Method

### 2.3.1 Audit Scope

The audit comprised a Licence Plan Audit conducted pursuant to the *WIC Act Audit Guidelines*.<sup>4</sup> The specific scope of the audit addressed identified requirements of the *Water Industry Competition (General) Regulation 2008* as they relate to the:

- *Infrastructure Operating Plan (IOP)*;
- *Water Quality Plan (drinking water) (WQP(dw))*; and
- *Sewage Management Plan (SMP)*.

The audit covered all elements of the existing (interim) components of the proposed schemes as described in **Section 2.2**. It will specifically exclude the proposed wastewater treatment plant and associated infrastructure.

As noted, a specific *Water Quality Plan (non-potable water) (WQP(npw))* has not been prepared for the purposes of the interim scheme. Notwithstanding, relevant requirements of the *Regulation* applicable to the interim non-potable water infrastructure and supply arrangements have been assessed on the basis of the documentation provided.

### 2.3.2 Audit Standard

The audit has been undertaken in accordance with the principles/guidance presented in:

- ISO 19011:2011 *Guidelines for auditing management systems*; and
- IPART, *Audit Guideline for Greenfield Schemes; Water Industry Competition Act 2006 (NSW)*, July 2013 (WIC Act Audit Guidelines).

### 2.3.3 Audit Steps

The audit has been undertaken generally in accordance with the procedure outlined in the *WIC Act Audit Guidelines*.

Following approval of an *Audit Proposal* by IPART, an *Audit Agenda* and *Information Request* were sent to both the Licensee and IPART approximately one week prior to the audit fieldwork being undertaken. Audit fieldwork comprising a site inspection of existing infrastructure and a desktop audit of relevant documentation/records was undertaken on 4 July 2017. Some additional items

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<sup>4</sup> IPART, *Audit Guideline for Greenfield Schemes; Water Industry Competition Act 2006 (NSW)*, July 2013.

of information and/or clarification were requested following the audit fieldwork and subsequently provided.

A draft audit report was prepared and submitted to the Licensee for review, before being finalised and issued to both the Licensee and IPART.

The audit process involved seeking objective evidence that the Licensee had complied with the obligations identified for audit by IPART. Evidence was obtained through interview, review of relevant documentation and records, and site inspection.

#### 2.3.4 Audit Team

The audit was conducted by Jim Sly and Dr Dan Deere, both of whom hold the required Lead Auditor accreditation on IPART’s Technical Services and Water Licensing Panel. The two auditors collectively addressed the various components of the audit, as follows:

- Jim Sly – audit team lead and audit of the *Infrastructure Operating Plan* and *Sewage Management Plan* components; and
- Dan Deere – audit of the *Drinking Water Quality Plan* and *Recycled Water Quality Plan* components.

Quality assurance review of the audit reports was undertaken by each auditor reviewing the other auditor’s work.

Catherine Hill Bay Water was represented by Wynn Owen (Solo Water Director), Craig Heininger (Operations Manager), Brad Irwin (Planning and New Schemes Manager), Steve Scifleet (QSE Manager), Tshinta O’Dwyer (Environment and Quality Coordinator), Alan Irving (Site Manager) and Ross Pascoe (Site Supervisor). IPART representative Robert Aposhian attended as an observer during the audit fieldwork.

#### 2.3.5 Audit Grades

Audit grades have been awarded in accordance with guidance presented in the *WIC Act Audit Guidelines*. The compliance grades applicable for the purposes of this audit were as identified in **Table 2.1**.

**Table 2.1 Audit Compliance Grades**

Compliance Grade	Description
Compliant	Sufficient evidence has been provided in the audit on which to make a judgment on all requirements, and all requirements have been met.
Non-compliant Insignificant	There is a deficiency in compliance, however, it does not adversely impact on the ability of the Licensee to achieve defined objectives or assure controlled processes, products or outcomes.
Non-compliant Significant	There is a deficiency in compliance which adversely impact on the ability of the Licensee to achieve defined objectives or assure controlled processes, products or outcomes.
No Requirement	There was no requirement to comply with the Licence condition during the audit period.

## 2.4 Regulatory Regime

The Catherine Hill Bay Water schemes operate in accordance with the provisions of a Network Operator's Licence (Licence No: 16\_035) issued under the *Water Industry Competition Act 2006* (NSW). Other relevant regulatory instruments and standards/guidelines include:

- *Water Industry Competition (General) Regulation 2008 (NSW)*;
- IPART, *Audit Guideline for Greenfield Schemes; Water Industry Competition Act 2006 (NSW)*, July 2013;
- *Australian Drinking Water Guidelines 2011 (as amended 2016)*;
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) 2006*;
- *Plumbing Code of Australia*;
- *Plumbing and Drainage Act 2011 (NSW)*; and
- NSW and national water industry and environmental regulations and codes of practice as applicable.

## 2.5 Quality Assurance Process

The quality of this audit report was assured through a professional review process. The report has been independently reviewed by a Lead Auditor who holds relevant accreditation on IPART's Technical Services and Water Licensing Panel.

## 2.6 Audit Findings

Audit findings are summarised in the following **Sections 3 to 6**, and are presented in full detail in **Appendices A to D**.

## 3. Infrastructure Operating Plan

### 3.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *Infrastructure Operating Plan*. Detailed assessment in respect of these clauses is presented in **Appendix A**.

### 3.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 3.3 Opportunities for Improvement

The following opportunities for improvement have been identified in respect of the audited *WIC Regulation* clauses related to the *Infrastructure Operating Plan*:

- **OFI-CHB-LPA.001:** It is suggested that Catherine Hill Bay Water includes more specific details in respect of the continuity of sewerage services in the *Infrastructure Operating Plan* (similar to that provided in respect of the continuity of water supply).
- **OFI-CHB-LPA.002:** it is suggested that Catherine Hill Bay Water documents its procedure for the use of tankered potable water as a back-up supply, and that it ensures that water cartage contractors have a registered quality assurance program in place (pursuant to the NSW Health /NSW Food Authority *NSW Guidelines for Water Carters 2012*).

## 4. Water Quality Plan (Drinking Water)

### 4.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *Water Quality Plan (Drinking Water)*. Detailed assessment in respect of these clauses is presented in **Appendix B**.

### 4.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 4.3 Opportunities for Improvement

The following opportunity for improvement has been identified in respect of the audited *WTC Regulation* clauses related to the *Water Quality Plan (Drinking Water)*:

- **OFI-CHB-LPA.003:** It is suggested that Catherine Hill Bay Water/Solo Water considers publishing both the *Customer Contract* and *Home Owner's Manual*, with readily identifiable links, on the Solo Water website.

## 5. Water Quality Plan (Non-potable Water)

### 5.1 Summary of Findings

As noted in **Section 2.3.1**, a specific *Water Quality Plan (Non-potable Water)* has not been prepared for the purposes of the interim scheme. Nonetheless, the audit has included an assessment of compliance of the non-potable water scheme under the interim arrangements (i.e. during the period it is charged with potable water) on the basis of information presented in other documentation, principally the *Water Quality Plan (Drinking Water)*.

On the basis of this assessment, there were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *Water Quality Plan (Non-potable Water)*. Detailed assessment in respect of these clauses is presented in **Appendix C**.

### 5.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 5.3 Opportunities for Improvement

The following opportunity for improvement has been identified in respect of the audited *WTC Regulation* clauses related to the *Water Quality Plan (Non-potable Water)*:

- **OFI-CHB-LPA.004:** It is suggested that Catherine Hill Bay Water/Solo Water develops and publishes a *Recycled Water Quality Policy* notwithstanding that the recycled water network will initially be charged with potable water.

## 6. Sewage Management Plan

### 6.1 Summary of Findings

There were no identified non-compliances in respect of the audited clauses of the *Water Industry Competition (General) Regulation 2008* related to the *Sewage Management Plan*. Detailed assessment in respect of these clauses is presented in **Appendix D**.

### 6.2 Review of Actions

The Licensee has not made any suggestions for corrections or clarifications following issue of the draft report and prior to the final report being issued.

### 6.3 Opportunities for Improvement

No opportunities for improvement have been identified in respect of the audited *WIC Regulation* clauses related to the *Sewage Management Plan*.





## **Appendix A** Detailed Audit Findings – Infrastructure Operating Plan (IOP)

Detailed audit findings in respect of the *Infrastructure Operating Plan* (IOP) are presented in this Appendix.



Table A.1 IOP Audit Table – WIC Reg Sched 1 cl.6(1)(a) and/or cl.13(1)(a)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(1)(a) and/or cl.13(1)(a)</b>	The IOP indicates the arrangements in relation to the design, construction, operation and maintenance of the infrastructure, including particulars as to the life-span of the infrastructure, the system redundancy built into the infrastructure and the arrangements for renewal of the infrastructure.	<b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
This presents a high operational risk. Knowledge of the capacity and constraints associated with the infrastructure is essential to the effective management of the infrastructure assets in delivering agreed levels of service.	Full development of the Infrastructure Operating Plan, including development of an Asset Management Plan and demonstrated implementation of the infrastructure management practices documented therein.	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.</li> <li>▪ Pressure Sewer Solutions, <i>Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW</i> (Revision 3), 24 October 2013.</li> <li>▪ Pressure Sewer Solutions, <i>Catherine Hill Bay; Pressure Sewerage System Masterplan Report</i> (Revision 3), 24 October 2013.</li> <li>▪ Pressure Sewer Solutions, <i>Recycled Water Reticulation Master Plan Report; Catherine Hill Bay NSW</i> (Revision 3), 24 October 2013.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Interim Works RTU</i> (Revision 1-01), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality</i> (Revision 0-21), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations</i> (Revision 1-10), July 2017.</li> <li>▪ Solo, <i>Safety, Environment and Quality Regulatory Compliance Register</i> (extracts provided).</li> <li>▪ Solo Water, <i>Catherine Hill Bay; Residential Subdivision – Stage 1; Potable Water, Recycled Water and Pressure Sewer Services</i> (Drawing Set as issued for construction, including standard drawings).</li> <li>▪ <i>Service Agreement; For the Provision of Construction Services, Retail Services and O&amp;M Services at the Catherine Hill Bay Development</i> between Catherine Hill Bay Water Utility Pty Ltd and Solo Water Pty Ltd, undated.</li> <li>▪ NSW Government, <i>Network Operator’s Licence No: 16_035</i> (as issued on 22 March 2016).</li> <li>▪ Solo Water, <i>Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme</i> (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.</li> </ul>		

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- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
  - Solo Water, *Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017.
  - Solo, *Asset Register* (IMS-GNRL-G-4403) (Issue no: 1.0), April 2017.
  - Solo, *CHB Interim Scheme Drawing Register* (IMS-CONT-G-1684-SW) (Issue No: 1.0), April 2017.
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### Summary of reasons for grade

The *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, indicates the arrangements adopted in relation to the design, construction, operation, maintenance and renewal (life cycle management) of the infrastructure. Accordingly, Catherine Hill Bay Water is considered to have demonstrated full compliance with this obligation.

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### Discussion and notes

#### **Overview:**

The infrastructure that is the subject of this audit comprises the Stage 1 (Interim Scheme) drinking water, sewerage and recycled water infrastructure that will service “The Beaches” development at Catherine Hill Bay. As reported in Section 2.2 (of this report), the infrastructure will comprise:

- a potable (drinking) water network that will draw water from an existing bulk potable water supply, with an inline chlorine monitoring and dosing system;
- a pressure sewer collection network, together with an interim pump out tank (for disposal of sewage by road tanker); and
- a non-potable (recycled) water network that will initially be charged with potable water via a cross connection from the potable water supply located downstream of the chlorine dosing point.

A wastewater treatment plant is to be commissioned in approximately 12 months’ time, following which:

- sewage will be treated at the site to produce recycled water; and
- the non-potable water network will be charged with recycled water.

The treatment plant and associated operational arrangements are not assessed as part of this audit.

#### **Infrastructure Design:**

The *Infrastructure Operating Plan*<sup>5</sup> outlines the arrangements in respect of the design of the infrastructure including identification of the area to be serviced, the proposed levels of service (by reference to the *Customer Contract*),<sup>6</sup> service standards, the basis of the system design, and proposed future extension of the systems. It also identifies planning and design as a key component in relation to asset lifecycle management.<sup>7</sup>

The *Infrastructure Operating Plan*<sup>8</sup> refers to the respective Master Plans (*Drinking Water Master Plan*,<sup>9</sup> *Sewerage Master Plan*<sup>10</sup> and *Recycled Water Master Plan*<sup>11</sup>) which provide the design basis for the interim schemes at Catherine Hill Bay, and will also serve as the basis for future system augmentations.

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<sup>5</sup> *Infrastructure Operating Plan*, section 2.

<sup>6</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.

<sup>7</sup> *Infrastructure Operating Plan*, section 6.1.

<sup>8</sup> *Infrastructure Operating Plan*, section 2.4 and 2.5.

<sup>9</sup> Pressure Sewer Solutions, *Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW* (Revision 3), 24 October 2013.

<sup>10</sup> Pressure Sewer Solutions, *Catherine Hill Bay; Pressure Sewerage System Masterplan Report* (Revision 3), 24 October 2013.

<sup>11</sup> Pressure Sewer Solutions, *Recycled Water Reticulation Master Plan Report; Catherine Hill Bay NSW* (Revision 3), 24 October 2013.<sup>12</sup> *Infrastructure Operating Plan*, section 3.2.

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In each case, the Master Plans, which address full uptake of the proposed development at Catherine Hill Bay, identify the design objectives, design standards and anticipated system loading, as well as presenting a concept design the system based hydraulic modelling. The *Drinking Water Master Plan* and *Recycled Water Master Plan* also include standard construction details for items such as scour points, hydrants and property service connections, whilst the *Sewerage Master Plan* provides an outline of the monitoring and control requirements for the pressure sewer system.

The *Infrastructure Operating Plan*<sup>12</sup> also describes the control philosophy, a critical component of the overall design of the system and its subsequent operation. Review of functional specifications for the Interim Works (which includes control of the chlorine re-dosing skid and sewage collection tank),<sup>13</sup> Bulk Potable Water Pump Station<sup>14</sup> and Network Sewage Pump Stations<sup>15</sup> reveals that they identify appropriate control, monitoring, control and alarm arrangements for the infrastructure.

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, clearly outlines the arrangements in relation to design of the infrastructure.

### ***Infrastructure Construction:***

The *Infrastructure Operating Plan*<sup>16</sup> outlines the arrangements in respect of asset creation and procurement. This indicates that each new scheme or asset renewal is treated as an individual project, which is delivered in accordance with a defined framework. “*Engagement of contractors and suppliers in accordance with a project plan and procurement strategy*” is one of the elements of this framework.

The relevant standards and codes are nominated (albeit at a high level) and arrangements (responsibilities) in respect of compliance with such standards and codes are identified. Reference is made to the *Regulatory Compliance Document Register*,<sup>17</sup> which lists standards, codes and other guidance relevant to design and construction of the infrastructure. Principal amongst these are codes published by the Water Services Association of Australia (WSAA), including:

- *Water Supply Code of Australia*, WSA 03-2002, Hunter Water Edition;
- *Sewerage Code of Australia*, WSA 02-2002 Version 2.3; and
- *Pressure Sewer Code of Australia*, WSA 07-2007.

Review of construction drawings for Stage 1 of the development<sup>18</sup> (for example) reveals that the designs appear to be consistent with the arrangements set out in the Master Plans and the identified design standards, thereby providing an appropriate basis for construction of the infrastructure.

The *Infrastructure Operating Plan*<sup>19</sup> references a *Services Agreement*<sup>20</sup> between Catherine Hill Bay Water and Solo Water indicates that Solo Water will provide Construction Services in relation to the Catherine Hill Bay infrastructure. Engagement of Solo Water in the management of construction activities is appropriate given that it (Solo Water) is nominated as an Authorised Person in the Licence.<sup>21</sup>

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, clearly outlines the arrangements in relation to construction of the infrastructure.

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<sup>12</sup> *Infrastructure Operating Plan*, section 3.2.

<sup>13</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Interim Works RTU* (Revision 1-01), July 2017.

<sup>14</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality* (Revision 0-21), July 2017.

<sup>15</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations* (Revision 1-10), July 2017.

<sup>16</sup> *Infrastructure Operating Plan*, section 6.2.

<sup>17</sup> Solo, *Safety, Environment and Quality Regulatory Compliance Register* (extracts provided).

<sup>18</sup> Solo Water, *Catherine Hill Bay; Residential Subdivision – Stage 1; Potable Water, Recycled Water and Pressure Sewer Services* (Drawing Set as issued for construction, including standard drawings).

<sup>19</sup> *Infrastructure Operating Plan*, section 6.2.

<sup>20</sup> *Service Agreement; For the Provision of Construction Services, Retail Services and O&M Services at the Catherine Hill Bay Development* between Catherine Hill Bay Water Utility Pty Ltd and Solo Water Pty Ltd, undated.

<sup>21</sup> NSW Government, *Network Operator’s Licence No: 16\_035* (as issued on 22 March 2016), tables 1.1, 2.1 and 3.1.

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### ***Operation and Maintenance of the Infrastructure:***

The *Infrastructure Operating Plan* outlines the strategies to be adopted in relation to operation<sup>22</sup> and maintenance<sup>23</sup> of the infrastructure.

The operational strategy addresses routine and abnormal /unplanned operations; automation of routine operation; staffing; and the need to optimise performance and operating costs. It is proposed to staff the system on a five (5) days per week, normal working hours, basis and to rely on the SCADA system to initiate after-hours intervention.

Catherine Hill Bay Water has adopted a risk-based approach to maintenance, with assets categorised as either:

- Failure prevention (critical) assets – which attract unacceptable consequences in the event of failure and require a higher level of maintenance. Preventive and corrective maintenance, in conjunction with condition monitoring, is proposed.
- Can operate to fail assets – failure of which will not normally result in unacceptable consequences. These assets are further categorised as key and general equipment; key equipment is often installed in a duty/standby configuration.

The maintenance regime includes a combination of preventive, corrective, breakdown and major periodic maintenance activities.

Reference is made to the *Operator's Manual*<sup>24</sup> and documented procedures in relation to both operation and maintenance of the infrastructure; more specific reference to these documents is also made in the *Drinking Water Quality Plan*<sup>25</sup> and *Sewage Management Plan*.<sup>26</sup> Review of these supporting documents as part the New Infrastructure Audit<sup>27</sup> conducted in conjunction with this audit revealed that they identify the arrangements and provide appropriate guidance for the operation and maintenance of the infrastructure.

The *Infrastructure Operating Plan* identifies the role of operational staff in operating and maintaining the infrastructure;<sup>28</sup> specific roles and responsibilities are defined<sup>29</sup> with specific detail presented in individual position descriptions (which were reviewed in detail as part of the abovementioned New Infrastructure Audit).

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, clearly outlines the arrangements in relation to operation and maintenance of the infrastructure.

### ***Lifecycle Asset Management:***

The *Infrastructure Operating Plan*<sup>30</sup> outlines the arrangements in relation to the lifecycle management of the assets. In addition to planning and design, asset creation and procurement, and operation and maintenance, each of which has been discussed above, it also addresses Catherine Hill Bay Water's asset renewal and asset information strategies.

The process for the renewal and replacement of assets will take into account industry guidance (as presented in the Water Services Association of Australia (WSAA) Codes) and equipment manufacturers' recommendations, in addition to performance monitoring and condition assessment.<sup>31</sup> The expected

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<sup>22</sup> *Infrastructure Operating Plan*, section 6.3.

<sup>23</sup> *Infrastructure Operating Plan*, section 6.4.

<sup>24</sup> Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme (IMS-OPER-B-8298-SW)* (Revision 1.1), 6 July 2017.

<sup>25</sup> *Drinking Water Quality Plan*, section 2.4.

<sup>26</sup> *Sewage Management Plan*, section 2.4.

<sup>27</sup> Cobbitty Consulting/Water Futures, *Catherine Hill Bay Water Utility; New Infrastructure Audit (Stage 1 – Interim Scheme)* (Version 2.0), 16 August 2017, table A.3.

<sup>28</sup> *Infrastructure Operating Plan*, section 6.3.2.

<sup>29</sup> *Infrastructure Operating Plan*, section 4.1.

<sup>30</sup> *Infrastructure Operating Plan*, section 6.

<sup>31</sup> *Infrastructure Operating Plan*, section 6.5.

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working life has been identified by asset type (class), and the relationship between assessed condition and remaining life defined (indicatively). Asset age, condition and remaining life has been defined for key equipment assets, noting that at this point in time all assets are new.

Critical assets have been identified; these include the bulk water pumping station, bulk water transfer main, chlorine dosing system and the sewage storage (pump out) tank under the Stage 1 (Interim Scheme) arrangements. This selection is considered appropriate.

Although not sighted by the auditors, the *Infrastructure Operating Plan*<sup>32</sup> references the *CHB Asset Management Reliability and Renewals Plan*, which sets out an anticipated renewals program over the next 30 years based on expected working lives of the assets.

Asset information is captured in an Asset Register and a set of Main Drawings.<sup>33</sup> Given the limited number of assets requiring regular maintenance under the Stage 1 (Interim Scheme) arrangements, the Asset Register and associated Maintenance Schedule are detailed in the *Operator's Manual*;<sup>34</sup> however, a standalone *Asset Register*<sup>35</sup> is also in place. Review (on a sample basis) confirms that the information presented in the *Operator's Manual* is consistent with that in the Asset Register; however, the *Asset Register* provides additional information (e.g. size/capacity; installation date; condition, criticality; and maintenance strategy) for use in managing the assets. A summary asset register is also presented in the *Infrastructure Operating Plan*.<sup>36</sup>

Main drawings, which cover all components of the drinking water, sewerage and recycled water schemes, are listed in the *Operator's Manual*.<sup>37</sup> They are also listed in a standalone *Drawing Register*;<sup>38</sup> review reveals that the two sources are consistent, although the *Drawing Register* provides additional information (e.g. current issue number).

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, clearly outlines the arrangements in relation to lifecycle management (including renewal) of the infrastructure assets.

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## Recommendations

There are no recommendations in respect of this obligation.

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## Opportunities for improvement

No opportunities for improvement have been identified in respect of this obligation.

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<sup>32</sup> *Infrastructure Operating Plan*, section 6.5.3.

<sup>33</sup> *Infrastructure Operating Plan*, section 6.6.

<sup>34</sup> Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017, tables 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6 (Asset Registers); and appendix B (Maintenance Schedule).

<sup>35</sup> Solo, *Asset Register* (IMS-GNRL-G-4403) (Issue no: 1.0), April 2017.

<sup>36</sup> *Infrastructure Operating Plan*, section 3.1.3.

<sup>37</sup> Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017, appendix C (Drawings List – Interim Scheme).

<sup>38</sup> Solo, *CHB Interim Scheme Drawing Register* (IMS-CONT-G-1684-SW) (Issue No: 1.0), April 2017.

**Table A.2 IOP Audit Table – WIC Reg Sched 1 cl.6(1)(b) and/or cl.13(1)(b)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(1)(b) and/or cl.13(1)(b)</b>	The IOP indicates the arrangements in relation to the continued safe and reliable performance of the infrastructure.	<b>Compliant</b>
<b>Risk</b> This presents a high operational risk. The risk is generally managed by the implementation of an asset management system/framework that outlines the basis for the ongoing management of the infrastructure assets.		<b>Target for Full Compliance</b> Preparation of an Asset Management Plan and supporting procedural documentation and demonstrated implementation of appropriate infrastructure management practices.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme</i> (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.</li> <li>▪ Solo, <i>Risk Register – Interim Scheme</i> (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The <i>Infrastructure Operating Plan</i> indicates the arrangements in relation to the lifecycle management of the infrastructure, the effective implementation of which will ensure the continued safe and reliable performance of the infrastructure. Referenced documents, including the <i>Operator’s Manual</i> and a portfolio of more detailed procedures, will support implementation of the arrangements set out in the <i>Infrastructure Operating Plan</i>.</p> <p>Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this obligation.</p>		
<b>Discussion and notes</b>		
<p>The continued safe and reliable performance of the infrastructure is dependent upon the implementation of effective operational, maintenance, condition monitoring, and renewal/replacement practices. The lifecycle management of the assets is described at a strategic level in the <i>Infrastructure Operating Plan</i>,<sup>39</sup> which outlines Catherine Hill Bay Water’s approach to planning and design, asset creation and procurement, operation and maintenance of the assets, asset renewal and the management of asset information. Each of these elements is discussed in Table A.1.</p> <p>As reported in Table A.1, the <i>Infrastructure Operating Plan</i>:</p> <ul style="list-style-type: none"> <li>▪ references the <i>Operator’s Manual</i><sup>40</sup> and a portfolio of more detailed operation and maintenance procedures, which collectively provide effective guidance for operation and maintenance of the infrastructure;</li> </ul>		

<sup>39</sup> *Infrastructure Operating Plan*, section 6.

<sup>40</sup> Solo Water, *Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.



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- identifies the role of operational staff in operating and maintaining the infrastructure;
  - describes how performance monitoring and condition assessment will be used in conjunction with asset life expectancies to plan asset renewal and/or replacement; an anticipated 30-year renewal program is in place.

The continued safe and reliable performance of the infrastructure is also dependent upon having a clear understanding of the associated risks. The *Infrastructure Operating Plan*<sup>41</sup> outlines Catherine Hill Bay Water's approach to hazard identification and risk management. The *Risk Register – Interim Scheme*<sup>42</sup> identifies hazards associated with the various components of the system and outlines an appropriate control strategy. Many of the identified hazards/risks relate to infrastructure performance; the risk assessment has contributed to the identification of critical assets, for which a more rigorous maintenance regime has been adopted. In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, appropriately outlines the arrangements in relation to continued safe and reliable performance of the infrastructure.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>41</sup> *Infrastructure Operating Plan*, section 5.

<sup>42</sup> Solo, *Risk Register – Interim Scheme* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.

**Table A.3** IOP Audit Table – WIC Reg Sched 1 cl.6(1)(c) and/or cl.13(1)(c)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(1)(c) and/or cl.13(1)(c)</b>	The IOP indicates the arrangements in relation to the continuity of the water supply and sewerage services.	<b>Compliant</b>
<b>Risk</b> This presents a high operational risk. The risk is generally managed by operating in accordance with agreed protocols for both planned and unplanned service interruptions.		<b>Target for Full Compliance</b> Development and implementation of appropriate protocols for both unplanned and planned service interruptions.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme</i> (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Interim Works RTU</i> (Revision 1-01), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality</i> (Revision 0-21), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations</i> (Revision 1-10), July 2017.</li> <li>▪ Solo, <i>Comms Outage</i> (IMS-OPER-D-8310-SW) (Issue No: 1.0), June 2017.</li> <li>▪ Solo, <i>Power Outage</i> (IMS-OPER-D-8309-SW) (Issue No: 1.0), June 2017.</li> <li>▪ Solo, <i>Sewer Pipeline Repair</i> (IMS-OPER-D-8308-SW) (Issue No: 1.0), June 2017.</li> <li>▪ Solo, <i>Water Pipeline Repair Procedure</i> (IMS-OPER-D-8200-SW) (Issue No: 1.0), June 2017.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017, section 3.4.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>Catherine Hill Bay Water has arrangements in place for ensuring (as far as practicable) the continuity of water supply; these arrangements are documented in the <i>Infrastructure Operating Plan</i> and referenced supporting documentation. Furthermore, it has developed protocols (commitments), documented in its <i>Customer Contract</i>, in respect of unplanned and planned service interruptions. These protocols are consistent with industry standards.</p> <p>Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this obligation.</p>		
<b>Discussion and notes</b>		
<p>The continuity of water supply and sewerage services may be subject to either planned or unplanned interruptions. This is consistent with the servicing provisions for both similar ‘land and housing’</p>		

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developments and the broader community.

The *Infrastructure Operating Plan* outlines arrangements in relation to continuity of supply.<sup>43</sup> Arrangements in relation to emergency response and incident management<sup>44</sup> are also applicable.

Primary risks associated with the continuity of water supply, which are equally applicable to both drinking water and recycled water supply under the Stage 1 (Interim Scheme) arrangements, are identified as:<sup>45</sup>

- “1. *Bulk Water Pump Station failure (power failure/ equipment failure).*
2. *Power supply failure at the Interim Site (Chlorine dosing system failure).*
3. *Bulk Water Transfer Pipeline failure (main break).”*

These risks have been mitigated through a number of controls, including:<sup>46</sup>

- “1. *Remote monitoring and alarm systems through the SCADA system.*
2. *Regular asset inspections, monitoring and asset maintenance in accordance with the Interim Scheme Operator’s Manual (IMS-OPER-B-8298-SW) and Asset Inspection Checklist Procedure (IMS IMS-OPER-D-8303-SW).*
3. *Provision for the connection of portable generators at the Bulk Water Pump Station (BWPS) and Interim Site.*
4. *Contingency planning incorporating the utilisation of bulk potable water tankers to provide continuity of potable water supply in the event of a BWPS failure or main break.”*

Arrangements in relation to the continuity of sewerage services are not specifically described in the *Infrastructure Operating Plan*, although there are references to specific procedures that do address the principal mitigation approach. As an opportunity for improvement (**OFI-CHB-LPA.001**), it is suggested that Catherine Hill Bay Water includes more specific details in respect of the continuity of sewerage services in the *Infrastructure Operating Plan* (similar to that provided in respect of the continuity of water supply).

Review of the SCADA system during the audit site inspection, as well as review of functional specifications for the Interim Works (which includes control of the chlorine re-dosing skid and sewage collection tank),<sup>47</sup> Bulk Potable Water Pump Station<sup>48</sup> and Network Sewage Pump Stations<sup>49</sup> reveals that the specified control, monitoring and alarm arrangements are appropriate to ensuring the continuity of services. The *Comms Outage Procedure*<sup>50</sup> outlines the arrangements, which include onsite monitoring of Bulk Water Pumping Station, Chlorination Facility, Pressure Sewer Units (PSUs) and Sewage Pump Out Tank, to be implemented in the event of communications failure.

The *Operator’s Manual*<sup>51</sup> and relevant operation and maintenance procedures outline arrangements, including asset inspections, monitoring and asset maintenance activities required to ensure the continued performance of the infrastructure, and therefore the continuity of services (refer Table A.1 and Table A.2). Key procedures for the management of incidents (ensuring continuity of services) are identified in the *Infrastructure Operating Plan*.<sup>52</sup>

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<sup>43</sup> *Infrastructure Operating Plan*, section 5.3.

<sup>44</sup> *Infrastructure Operating Plan*, section 5.4.

<sup>45</sup> *Infrastructure Operating Plan*, section 5.3.

<sup>46</sup> *Infrastructure Operating Plan*, section 5.3.

<sup>47</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Interim Works RTU* (Revision 1-01), July 2017.

<sup>48</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality* (Revision 0-21), July 2017.

<sup>49</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations* (Revision 1-10), July 2017.

<sup>50</sup> Solo, *Comms Outage* (IMS-OPER-D-8310-SW) (Issue No: 1.0), June 2017.

<sup>51</sup> Solo Water, *Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.

<sup>52</sup> *Infrastructure Operating Plan*, table 5.1.

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The *Power Outage Procedure*<sup>53</sup> details contingency arrangements to be implemented in the event of a power outage. These include:

- Arranging for bulk water tanker delivery;
- Hiring a 3-phase emergency generator to supply the Bulk Water Pumping Station;
- Initiating operation of the 3-phase emergency generator at the Interim Site (site of the Chlorination Facility and Sewage Pump Out Tank);
- Use a standby generator (single phase) to power PSUs on an as-needed basis (additional units to be hired if necessary);
- If necessary, engage a vacuum truck(s) to empty PSUs on an as needed basis; and
- Active monitoring of all components of the systems.

The *Sewer Pipeline Repair Procedure*<sup>54</sup> identifies the possible need to use vacuum trucks to empty PSUs. Similarly, the *Water Pipeline Repair Procedure*<sup>55</sup> identifies the conditions that would lead to arranging for bulk water tanker delivery.

Both the *Operator's Manual*<sup>56</sup> and the relevant procedures include contact details for arranging support, including Coates Hire for generators, Solo Resource Recovery for vacuum trucks (alternative resources are also identified) and Barneys Tank Cleaning for water cartage tankers.

During the audit, the location at which tankered water would be pumped into the system was inspected. The procedure would involve removing the cap from an air valve at a high point on the Bulk Transfer Main (located adjacent to the intersection of Montefiore Street and Woodbury Circuit) and installation of a hydrant connection. This procedure had not yet been formally documented at the time of reporting; however, Catherine Hill Bay Water advised that:

- It is currently in the process of assessing Barneys Tank Cleaning as a preferred supplier, which includes ensuring that it has all required accreditations in place; and
- Barneys Tank Cleaning is accredited for water carting by Hunter Water.

As an opportunity for improvement (**OFI-CHB-LPA.002**), it is suggested that Catherine Hill Bay Water documents its procedure for the use of tankered potable water as a back-up supply, and that it ensures that water cartage contractors have a registered quality assurance program in place (pursuant to the NSW Health/NSW Food Authority *NSW Guidelines for Water Carters 2012*).

The Solo Water *Customer Contract*,<sup>57</sup> which is referenced under the Levels of Service provisions of the *Infrastructure Operating Plan*,<sup>58</sup> sets out Catherine Hill Bay Water/Solo Water's commitments to its customers in the event of either planned or unplanned interruptions (as well as other factors that may affect service). These arrangements are generally consistent with the commitment to residential customers in (for example) Hunter Water's Customer Contract.<sup>59</sup>

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, outlines the arrangements in relation to ensuring continuity of the water supply and sewerage services.

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<sup>53</sup> Solo, *Power Outage* (IMS-OPER-D-8309-SW) (Issue No: 1.0), June 2017.

<sup>54</sup> Solo, *Sewer Pipeline Repair* (IMS-OPER-D-8308-SW) (Issue No: 1.0), June 2017.

<sup>55</sup> Solo, *Water Pipeline Repair Procedure* (IMS-OPER-D-8200-SW) (Issue No: 1.0), June 2017.

<sup>56</sup> Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017, table 2.2.

<sup>57</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017, section 3.4.

<sup>58</sup> *Infrastructure Operating Plan*, section 2.2.

<sup>59</sup> Hunter Water, *Customer Contract 2017-2022*, sections 8.1 and 8.2 (available at: <https://www.hunterwater.com.au/Resources/Documents/Legislation-and-Governance/Operating-Licence-and-Customer-Contract-2017-2022.pdf>).

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## Recommendations

There are no recommendations in respect of this obligation.

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## Opportunities for improvement

The following opportunities for improvement have been identified in respect of this obligation:

- **OFI-CHB-LPA.001:** It is suggested that Catherine Hill Bay Water includes more specific details in respect of the continuity of sewerage services in the *Infrastructure Operating Plan* (similar to that provided in respect of the continuity of water supply).
  - **OFI-CHB-LPA.002:** it is suggested that Catherine Hill Bay Water documents its procedure for the use of tankered potable water as a back-up supply, and that it ensures that water cartage contractors have a registered quality assurance program in place (pursuant to the NSW Health /NSW Food Authority *NSW Guidelines for Water Carters 2012*).
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**Table A.4** IOP Audit Table – WIC Reg Sched 1 cl.6(1)(d) and/or cl.13(1)(d)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(1)(d) and/or cl.13(1)(d)</b>	The IOP indicates the arrangements in relation to alternative water supplies and sewerage services when the infrastructure is inoperable.	<b>Compliant</b>
<b>Risk</b> This presents a high operational risk. The risk is generally managed by operating in accordance with agreed protocols for both planned and unplanned service interruptions.		<b>Target for Full Compliance</b> Development and implementation of appropriate protocols for both unplanned and planned service interruptions.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme</i> (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017, section 3.4.</li> <li>▪ IPART, <i>Network Operator’s Reporting Manual under the Water Industry Competition Act 2006</i>, June 2016.</li> </ul>		
<b>Summary of reasons for grade</b>		
As reported in Table A.3, Catherine Hill Bay Water has arrangements in place for ensuring (as far as practicable) the continuity of water supply; these include arrangements in relation to alternative water supplies and sewerage services when the infrastructure is inoperable. These arrangements are documented in the <i>Infrastructure Operating Plan</i> and referenced supporting documentation.		
Furthermore, the Solo Water <i>Customer Contract</i> clearly identifies conditions under which Catherine Hill Bay Water/Solo Water may be unable to maintain water supplies or sewerage services. Such conditions are consistent with those identified by other water utilities.		
Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this obligation.		
<b>Discussion and notes</b>		
Assessment of the arrangements in relation to alternative water supplies and sewerage services when the infrastructure is inoperable has been largely addressed by the discussion presented in Table A.3.		
Dependent upon what infrastructure is inoperable, principal responses in the case of inoperable infrastructure would involve:		
<ul style="list-style-type: none"> <li>▪ Tankering of water to maintain water supplies; and</li> <li>▪ Removal of sewage from Pressure Sewer Units (PSUs) using a vacuum truck.</li> </ul>		

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Details of these measures are as discussed in Table A.3.

The Solo Water *Customer Contract*,<sup>60</sup> which is referenced under the Levels of Service provisions of the *Infrastructure Operating Plan*,<sup>61</sup> indicates that in the case of unplanned interruptions: “if necessary and where practical we provide access to emergency supplies of water”. The need to provide alternative sewerage services (e.g. temporary toilet facilities) would not normally be deemed necessary given the storage capacity available in the pressure sewer units (PSUs).

The *Customer Contract*<sup>62</sup> also clearly identifies the conditions under which it may be unable to maintain the supply of drinking water or recycled water, or the provision of sewerage services. These conditions, which are consistent with other water utilities, include:

- planned or unplanned interruptions;
- in the case of water restrictions (for drinking water);
- circumstances in which Catherine Hill Bay Water/Solo Water is entitled to restrict supply/services (which are clearly defined);
- major operational difficulty (for recycled water, although it is noted that the recycled water system will be charged with drinking water under the Stage 1 (Interim Scheme) arrangements); and
- events beyond the reasonable control of Catherine Hill Bay Water/Solo Water.

It is noted that Catherine Hill Bay Water has nominated target service standards in relation to infrastructure performance and service interruptions in the *Infrastructure Operating Plan*.<sup>63</sup> The indicators for which targets have been set are consistent with the *Reporting Manual*,<sup>64</sup> nominated targets have been set relative to the reported performance of NSW Local Water Utilities.

In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, outlines the arrangements in relation to alternative water supplies and sewerage services when the infrastructure is inoperable.

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## Recommendations

There are no recommendations in respect of this obligation.

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## Opportunities for improvement

No opportunities for improvement have been identified in respect of this obligation.

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<sup>60</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017, section 3.4.2.

<sup>61</sup> *Infrastructure Operating Plan*, section 2.2.

<sup>62</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017, sections 3.1.1 (drinking water), 3.2.1 (recycled water) and 3.3.1 (wastewater).

<sup>63</sup> *Infrastructure Operating Plan*, section 2.3 (including table 2-1 and 2-2).

<sup>64</sup> IPART, IPART, *Network Operator’s Reporting Manual under the Water Industry Competition Act 2006*, June 2016, appendix F.

**Table A.5 IOP Audit Table – WIC Reg Sched 1 cl.6(1)(e) and/or cl.13(1)(e)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.6(1)(e) and/or cl.13(1)(e)</b>	The IOP indicates the arrangements in relation to the maintenance, monitoring and reporting of standards of service.	<b>Compliant</b>
<b>Risk</b> This presents a medium operational risk in that the Licensee may be unaware that standards of service are not being met in the absence of performance monitoring.		<b>Target for Full Compliance</b> Implementation of appropriate systems to monitor the service delivery performance of the infrastructure.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.</li> <li>▪ IPART, <i>Network Operator's Reporting Manual under the Water Industry Competition Act 2006</i>, June 2016.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Interim Works RTU</i> (Revision 1-01), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality</i> (Revision 0-21), July 2017.</li> <li>▪ Witthoft Engineering, <i>Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations</i> (Revision 1-10), July 2017.</li> <li>▪ Solo, <i>CHB Faults and Issues Register</i> (IMS-CONT-G-1674-SW) (Issue No: 1.0), April 2017.</li> <li>▪ Solo, <i>CHB Workorder Log</i> (IMS-CONT-G-1681-SW) (Issue No: 1.0), April 2017.</li> <li>▪ Solo, <i>IPART Reporting Procedure</i> (IMS-OPER-D-8324-SW) (Issue No: 1.0), June 2017.</li> <li>▪ Solo, <i>CHB Regulatory &amp; Formal Requirements Register</i> (IMS-CONT-G-1677-SW) (Issue No: 1.0), April 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The <i>Infrastructure Operating Plan</i> indicates the arrangements in relation to the maintenance, monitoring and reporting of standards of service, which are also clearly documented. Maintenance of standards is reliant on the implementation of relevant operation and maintenance procedures; monitoring and reporting is principally dependent upon the SCADA system and maintenance records.</p>		
<p>Accordingly, Catherine Hill Bay Water is assessed as being compliant with this obligation.</p>		



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## Discussion and notes

The *Infrastructure Operating Plan*<sup>65</sup> references the Solo Water *Customer Contract*<sup>66</sup> in relation to the levels of service that will be provided. Target service standards in relation to infrastructure performance, service interruptions, water quality and environmental performance are also nominated in the *Infrastructure Operating Plan*,<sup>67</sup> which indicates that the targets have been set relative to the reported performance of NSW Local Water Utilities. The indicators for which targets have been set are consistent with the *Reporting Manual*.<sup>68</sup>

Arrangements in relation to the maintenance of service standards (continuity of service) are discussed in Table A.3.

Monitoring (and indeed maintenance) of standards of service is heavily dependent on the SCADA monitoring and control system, the functionality of which (control philosophy) is described in the *Infrastructure Operating Plan*.<sup>69</sup> Review of functional specifications for the Interim Works (which includes control of the chlorine re-dosing skid and sewage collection tank),<sup>70</sup> Bulk Potable Water Pump Station<sup>71</sup> and Network Sewage Pump Stations<sup>72</sup> reveals that the appropriate parameters in relation to water quality and water consumption (for example) are monitored.

Operational and verification monitoring in respect of water quality is further addressed in the *Drinking Water Quality Plan*<sup>73</sup> and specific procedures referenced therein. Similarly monitoring in respect of the sewerage system is also addressed in the *Sewage Management Plan*.<sup>74</sup>

The *Operator's Manual* sets out in detail the arrangements in relation to monitoring of system performance, including parameters reflective of standards of service. The *Operator's Manual*<sup>75</sup> references the *CHB Faults and Issues Register*<sup>76</sup> and *CHB Work Order Log*<sup>77</sup> as the principal repositories for maintenance records prior to a proprietary asset management system being in place (this is proposed for the next stage of the scheme development). It is understood that monitoring of performance in respect of service interruptions would be based on information derived from these registers; review of these information sources confirms that appropriate information is to be recorded.

The *Infrastructure Operating Plan*<sup>78</sup> outlines the arrangements in relation to the reporting of standards of service. Principal amongst these is reporting to IPART in accordance with the *Reporting Manual*. Reference is made to *IPART Reporting Procedure*<sup>79</sup> and *Regulatory & Formal Requirements Register*<sup>80</sup> which together document the reporting requirements.

Requirements for reporting to stakeholders, including NSW Health and Solo Water's (Retail Supplier) customers, are also identified.

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<sup>65</sup> *Infrastructure Operating Plan*, section 2.2.

<sup>66</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.

<sup>67</sup> *Infrastructure Operating Plan*, section 2.3 (including table 2-1 and 2-2).

<sup>68</sup> IPART, *IPART, Network Operator's Reporting Manual under the Water Industry Competition Act 2006*, June 2016, appendix F.

<sup>69</sup> *Infrastructure Operating Plan*, section 3.2.

<sup>70</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Interim Works RTU* (Revision 1-01), July 2017.

<sup>71</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Bulk Potable Water Pump Station – WAE Interim Functionality* (Revision 0-21), July 2017.

<sup>72</sup> Witthoft Engineering, *Catherine Hill Bay; Functional Specification; Network Sewage Pump Stations* (Revision 1-10), July 2017.

<sup>73</sup> *Drinking Water Quality Plan*, sections 2.4.2 and 2.5.1 (respectively).

<sup>74</sup> *Sewage Management Plan*, sections 2.4.2 and 2.5.1.

<sup>75</sup> *Operator's Manual*, section 5.3.

<sup>76</sup> Solo, *CHB Faults and Issues Register* (IMS-CONT-G-1674-SW) (Issue No: 1.0), April 2017.

<sup>77</sup> Solo, *CHB Workorder Log* (IMS-CONT-G-1681-SW) (Issue No: 1.0), April 2017.

<sup>78</sup> *Infrastructure Operating Plan*, section 7.

<sup>79</sup> Solo, *IPART Reporting Procedure* (IMS-OPER-D-8324-SW) (Issue No: 1.0), June 2017.

<sup>80</sup> Solo, *CHB Regulatory & Formal Requirements Register* (IMS-CONT-G-1677-SW) (Issue No: 1.0), April 2017.

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In summary, the *Infrastructure Operating Plan*, in conjunction with referenced supporting documentation, outlines the arrangements in relation to the maintenance, monitoring and reporting of standards of service.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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## **Appendix B** Detailed Audit Findings – Water Quality Plan (Drinking Water) (WQP (dw))

Detailed audit findings in respect of the *Water Quality Plan (Drinking Water)* (WQP (dw)) are presented in this Appendix.



Table B.1 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 1

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 1. The WQP (dw) shows a commitment to water quality management.	<b>Compliant</b>
<b>Risk</b>		<b>Target for Full Compliance</b>
The lack of a water quality policy, up to date and accurate details for regulatory and formal requirements and contact details for stakeholders presents a small operational risk for this scheme.		A water quality policy, an up to date list of regulatory and formal requirements and an up to date list of stakeholders and their contact details.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Pressure Sewer Solutions, <i>Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW</i> (Revision 3), 24 October 2013.</li> <li>▪ Solo, <i>Drinking Water Policy</i>, (IMS-ENVM-A-3729-SW) (Issue No: 1.0), April 2017.</li> <li>▪ Solo, <i>CHB Regulatory &amp; Formal Requirements</i> (IMS-CONT-G-1677-SW) (Issue No: 1.0), April 2017.</li> <li>▪ Solo, <i>Safety, Environment and Quality Regulatory Compliance Register</i> (extracts provided).</li> <li>▪ Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: <i>Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure</i>).</li> <li>▪ Solo, <i>CHB Stakeholder Register</i> (IMS-CONT-G-1679-SW) (Issue No: 1.0), April 2017 (living document).</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water demonstrated that it has a water quality policy, an up-to-date list of regulatory and formal requirements and stakeholders and had adequately identified and engaged with its principal stakeholders. Consequently, Catherine Hill Bay Water was considered compliant with this requirement.		
<b>Discussion and notes</b>		
<b>Policy:</b>		
The <i>Drinking Water Policy</i> <sup>81</sup> was completed and is appropriate. It is too early to assess how well the new policy has been communicated. At present Catherine Hill Bay Water/Solo Water is quite small so this isn't a major issue as it can be in larger companies.		
<b>Regulatory and formal requirements:</b>		
Catherine Hill Bay Water sets out in detail how it will retain awareness and compliance with its regulatory		

<sup>81</sup> Solo, *Drinking Water Policy*, (IMS-ENVM-A-3729-SW) (Issue No: 1.0), April 2017.

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and formal requirements within its *Drinking Water Quality Plan*. A number of formal procedures have been developed to support this compliance involving summarising its compliance requirements<sup>82</sup> and maintaining an up to date register of them.<sup>83</sup>

***Stakeholders:***

Catherine Hill Bay Water has identified its principal stakeholders<sup>84</sup> and engaged with them. There was good evidence of Catherine Hill Bay Water engagement with key stakeholders such as NSW Health, Central Coast Council, Hunter Water and IPART. For instance, Philippe Porigneaux, Environmental Health Manager, NSW Health Hunter New England Population Health, was involved in the scheme risk assessment and in reviewing multiple scheme documents with NSW Health being subsequently engaged by Catherine Hill Bay Water at various points in the development of the scheme.<sup>85</sup>

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**Recommendations**

There are no recommendations in respect of this obligation.

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**Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>82</sup> Solo, *CHB Regulatory & Formal Requirements* (IMS-CONT-G-1677-SW) (Issue No: 1.0), April 2017.

<sup>83</sup> Solo, *Safety, Environment and Quality Regulatory Compliance Register* (extracts provided).

<sup>84</sup> Solo, *CHB Stakeholder Register* (IMS-CONT-G-1679-SW) (Issue No: 1.0), April 2017 (living document).

<sup>85</sup> Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).

Table B.2 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 2

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 2. The WQP (dw) includes an assessment of the water supply system.	<b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
Failure to adequately describe the system and assess risks could lead to risks being overlooked.	Adequate system description and risk assessment.	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Pressure Sewer Solutions, <i>Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW</i> (Revision 3), 24 October 2013.</li> <li>▪ Solo Water, <i>Process Flow Diagram; Interim Potable System</i> (Rev 3), 11 May 2017.</li> <li>▪ Solo, <i>Catherine Hill Bay Water Utility; Interim Water Supply Risk Assessment</i> (IMS-ENVM-3635-SW) (Version 2.1), 6 June 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>Catherine Hill Bay Water demonstrated full compliance with this requirement. The <i>Drinking Water Quality Plan</i> provided full details of the physical system being assessed, the risk assessment team, methodology and of the risk assessment itself.</p> <p>Accordingly, Catherine Hill Bay Water is assessed to be compliant with this requirement.</p>		
<b>Discussion and notes</b>		
<b>Flow diagram:</b>		
<p>A flow diagram is provided both within the <i>Drinking Water Quality Plan</i> and as a standalone file.<sup>86</sup> The flow diagram is simple, reflects the situation observed on the ground and is sufficient for this simple system.</p>		
<b>Documentation of pertinent information:</b>		
<p>This scheme is adequately described within the body of the <i>Drinking Water Quality Plan</i>. In addition, there are detailed design documents and drawings in place.<sup>87</sup></p>		
<b>Risk assessment:</b>		
<p>The risk assessment team appeared adequate and included Catherine Hill Bay Water/Solo Water staff and consultants as well as Philippe Porigneaux, Environmental Health Manager, NSW Health Hunter New</p>		

<sup>86</sup> Solo Water, *Process Flow Diagram; Interim Potable System* (Rev 3), 11 May 2017.

<sup>87</sup> Pressure Sewer Solutions, *Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW* (Revision 3), 24 October 2013.

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England Population Health, in a participatory and review role. The risk assessment has been documented within the body of the *Drinking Water Quality Plan* as well as existing as a living worksheet register.<sup>88</sup> The risk register covers both maximum and residual risk and assessed likelihood and consequence, as set out in the ADWG.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>88</sup> Solo, *Catherine Hill Bay Water Utility; Interim Water Supply Risk Assessment* (IMS-ENVM-3635-SW) (Version 2.1), 6 June 2017.



**Table B.3 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 3**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 3. The WQP (dw) outlines the preventive measures for drinking water quality management.	<b>Compliant</b>
<b>Risk</b> Failure to adequately define preventive measures and assess residual risks could lead to risks being overlooked.		<b>Target for Full Compliance</b> Adequate definition of preventive measures and residual risk assessment.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water, <i>Process Flow Diagram; Interim Potable System</i> (Rev 3), 11 May 2017.</li> <li>▪ Solo, <i>Catherine Hill Bay Water Utility; Interim Water Supply Risk Assessment</i> (IMS-ENVM-3635-SW) (Version 2.1), 6 June 2017.</li> <li>▪ Solo, <i>CCP Free Chlorine Management Procedure</i> (IMS-OPER-D-8331-SW) (Issue No: 1.0), June 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water has provided sufficient detail in relation to its drinking water risk management measures for the supply of potable water. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.		
<b>Discussion and notes</b>		
<b><i>Identification of preventive measures and residual risk assessment:</i></b>		
The risk assessment included consideration of preventive measures and residual risk and assessed likelihood and consequence, as set out in the ADWG. The preventive measures are documented in detail within the body of the <i>Drinking Water Quality Plan</i> as well as existing within a living worksheet register. <sup>89</sup> The identification appears thorough and appropriate.		
<b><i>Critical control points:</i></b>		
The chlorination system is being identified within the <i>Drinking Water Quality Plan</i> as being the critical control point (CCP) for this scheme, which is appropriate for a scheme of this scale. The target criteria and critical limits for the CCP are set out in the supporting procedure. <sup>90</sup> For instance, process limits at the chlorine CCP included a target value of 1.5 mg/L, an operational limit of <1 mg/L or > 2 mg/L and critical limits of < 0.4 mg/L or > 3 mg/L. There is no low pressure CCP but there is a low pressure alarm. With respect to residual chlorine in the network, a target of 0.2 mg/L has been set. Given that the raw water supplying this site is potable water from a neighbouring local government water utility, these limits are considered adequate.		

<sup>89</sup> Solo, *Catherine Hill Bay Water Utility; Interim Water Supply Risk Assessment* (IMS-ENVM-3635-SW) (Version 2.1), 6 June 2017.

<sup>90</sup> Solo, *CCP Free Chlorine Management Procedure* (IMS-OPER-D-8331-SW) (Issue No: 1.0), June 2017.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.4 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 4**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 4. The WQP (dw) outlines the operational procedures and process control for the scheme.	<b>Compliant</b>

**Risk**

Failure to adequately formalise procedures could lead to inconsistent operation and exposes customers to risk of poor quality water being.

**Target for Full Compliance**

Adequate detail on operational procedures to protect water quality.

**Evidence sighted**

- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Solo Water, *Process Flow Diagram; Interim Potable System* (Rev 3), 11 May 2017.
- Solo, *Catherine Hill Bay Water Utility; Interim Water Supply Risk Assessment* (IMS-ENVM-3635-SW) (Version 2.1), 6 June 2017.
- Solo Water, *Plumbing Connection Process* (SW-BUILDERS GUIDE STAGE 1 160928), undated, available at: <http://www.solowater.com.au/wp-content/uploads/2017/02/SW-Builders-Guide-Stage-1-160928-1.pdf>
- Solo, *Suspected Cross Connection Procedure* (IMS-OPER-D-8304-SW) (Issue No: 1.0), June 2017.
- Solo, *GIS Meter Procedure* (IMS-OPER-D-8315-SW) (Issue No: 1.0), June 2017.
- Solo, *CCP Free Chlorine Management Procedure* (IMS-OPER-D-8331-SW) (Issue No: 1.0), June 2017.
- Solo, *Corrective Action Request (CAR) Procedure* (IMS-COMP-D-0817) (Issue No: 4.1), June 2017.
- Solo, *Field Asset Maintenance Checklist* (IMS-OPER-F-8329-SW) (Issue No: 1.0), May 2017.
- Solo, *Field Asset Maintenance Procedure* (IMS-OPER-D-8326-SW) (Issue No: 1.0), June 2017.
- Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.
- Solo, *Catherine Hill Bay; Operations Workflow Checklist* (IMS-CONT-G-1683-SW) (Issue No: 1.0), May 2017.

**Summary of reasons for grade**

Catherine Hill Bay Water has provided sufficient detail in relation to its operational, inspection and maintenance procedures and process control philosophy information for this infrastructure for its current state of construction. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.

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## Discussion and notes

### ***Operational procedures, monitoring and corrective actions:***

Catherine Hill Bay Water has developed procedures covering the main routine processes required to manage water quality and to undertake corrective actions. An operational manual<sup>91</sup> and a supporting checklist<sup>92</sup> and procedure<sup>93</sup> for general maintenance and workflow checklist<sup>94</sup> have been developed for the scheme. Many of the more detailed procedures are explicitly referenced in the *Drinking Water Quality Plan* and the auditor reviewed a sample of these procedures, including those related to operating the chlorinator,<sup>95</sup> checking appropriate plumbing connections,<sup>96</sup> gaining accurate meter readings,<sup>97</sup> responding to suspected cross-connections<sup>98</sup> and undertaking corrective actions.<sup>99</sup> For the chlorine CCP, a SCADA system will monitor and control chlorine dosing with that data being captured for auditing and reporting. SCADA will provide exception reporting through alarms with the alarm limits being witnessed during the field audit.

### ***Use of suitable chemicals:***

The only chemical added to this drinking water scheme by the Licence Holder is chlorine. The chlorine is supplied by Castle Chemicals as approximately 12% sodium hypochlorite. The label on the chemical and its storage container referred to Castle Chemicals Chlor 12. Review of the product summary for Chlor 12 did not state that it was unsuitable for addition to potable water; but nor did it state that it was intended as a drinking water additive.<sup>100</sup> However, review of the Safety Data Sheet did state that it was intended as a 'potable water sanitiser'.<sup>101</sup> The suitability of Chlor 12 for potable water use was further endorsed by a communication between the supplier and Catherine Hill Bay Water<sup>102</sup> that referenced the Australian Drinking Water Guidelines. Therefore, Chlor 12 was considered fit for purpose for sanitising potable water.

### ***Use of approved materials:***

The *Drinking Water Master Plan*<sup>103</sup> and associated drawings reference the adoption of the Water Services Association of Australia (WSAA) *Water Supply Code of Australia*, WSA 03-2002, Hunter Water Edition, the *Plumbing Code of Australia* and AS/NZS 3500 *Plumbing and drainage*. These standards in turn cover the need to utilise materials in contact with drinking water that are fit-for-purpose and that comply with AS/NZS 4020 *Testing of products for use in contact with drinking water*.

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## Recommendations

There are no recommendations in respect of this obligation.

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<sup>91</sup> Solo Water, *Operator's Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.

<sup>92</sup> Solo, *Field Asset Maintenance Checklist* (IMS-OPER-F-8329-SW) (Issue No: 1.0), May 2017.

<sup>93</sup> Solo, *Field Asset Maintenance Procedure* (IMS-OPER-D-8326-SW) (Issue No: 1.0), June 2017.

<sup>94</sup> Solo, *Catherine Hill Bay; Operations Workflow Checklist* (IMS-CONT-G-1683-SW) (Issue No: 1.0), May 2017.

<sup>95</sup> Solo, *CCP Free Chlorine Management Procedure* (IMS-OPER-D-8331-SW) (Issue No: 1.0), June 2017.

<sup>96</sup> Solo, *Suspected Cross Connection Procedure* (IMS-OPER-D-8304-SW) (Issue No: 1.0), June 2017.

<sup>97</sup> Solo, *GIS Meter Procedure* (IMS-OPER-D-8315-SW) (Issue No: 1.0), June 2017.

<sup>98</sup> Solo, *Suspected Cross Connection Procedure* (IMS-OPER-D-8304-SW) (Issue No: 1.0), June 2017.

<sup>99</sup> Solo, *Corrective Action Request (CAR) Procedure* (IMS-COMP-D-0817) (Issue No: 4.1), June 2017.

<sup>100</sup> Castle Chemicals, *Technical Bulletin Chlor 12 Liquid Chlorine Bleach*, available at [http://castlechem.com.au/sds/Chlor12\\_tb.pdf](http://castlechem.com.au/sds/Chlor12_tb.pdf).

<sup>101</sup> Castle Chemicals, *Safety Data Sheet, Chlor 12*, Version 1.2, 14<sup>th</sup> February 2017.

<sup>102</sup> Email from Graham Hatfield of Castle Chemicals to Ross Pascoe of Solo Water with subject "FW: Use of Chlor 12 for Chlorinating Potable water", dated 5th July 2017.

<sup>103</sup> Pressure Sewer Solutions, *Potable Water Reticulation Master Plan Report; Catherine Hill Bay NSW* (Revision 3), 24 October 2013.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.5 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 5**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 5. The WQP (dw) outlines the process for verification of the drinking water quality.	<b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
Inadequate verification presents a risk of ongoing supply of unfit water over the longer term.	A suitable verification program is required to ensure that ongoing monitoring and assurance takes place.	

#### Evidence sighted

- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Solo, *Incident Response and Notification Management Plan* (IMS-AIIR-B-0041-SW) (Issue No: 1.2), June 2017.
- Solo, *Water Quality Monitoring Procedure* (IMS-OPER-D-8305-SW) (Issue No: 1.0), June 2017.
- Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).
- Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.
- Solo Water, *Catherine Hill Bay; Home Owner's Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.

#### Summary of reasons for grade

Catherine Hill Bay Water has provided sufficient detail in relation to its drinking water quality verification for this minimal, passive infrastructure. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.

#### Discussion and notes

##### **Verification of drinking water quality:**

The *Drinking Water Quality Plan* summarises the ongoing verification monitoring, which is an appropriate program, and which has been agreed in consultation with NSW Health.<sup>104</sup> Samples are to be collected by an external NATA accredited facility using a defined monitoring plan.<sup>105</sup> Corrective actions or emergency responses following deviations identified due to verification monitoring will follow the agreed protocols.<sup>106</sup>

##### **Verification of customer satisfaction:**

Should customer complaints arise, Solo Water (in its role as the retail supplier) has set up a call centre

<sup>104</sup> Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).

<sup>105</sup> Solo, *Water Quality Monitoring Procedure* (IMS-OPER-D-8305-SW) (Issue No: 1.0), June 2017.

<sup>106</sup> Solo, *Incident Response and Notification Management Plan* (IMS-AIIR-B-0041-SW) (Issue No: 1.2), June 2017.

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number (1300 SOLO WU) which is an internal number for billing enquiries and customer enquiries. In the short term the number goes through to the Solo Water Tweed Heads head office. If the relevant number is selected by the caller the enquiry goes directly to the operator (Alan Irving); Solo Water is an Authorised Person under the Network Operator's Licence as well as being the retail supplier (and parent company of Catherine Hill Bay Water). This provides a good and direct link from first contact customer satisfaction verification feedback and the operator. The customer service expectations are set out in the relevant contract<sup>107</sup> and in a relation to some of the aspects relating to possible cross-connection issues in a more user-friendly manual.<sup>108</sup>

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>107</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.

<sup>108</sup> Solo Water, *Catherine Hill Bay; Home Owner's Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.

**Table B.6 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 6**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 6. The WQP (dw) includes details on the management of incidents and emergencies.	<b>Compliant</b>

**Risk**

**Target for Full Compliance**

The absence of an approach for handling incidents and emergencies presents a risk of poor response to incidents arising related to the drinking water supply scheme.

An adequate management plan for incidents and emergencies.

**Evidence sighted**

- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Solo, *Incident Response and Notification Management Plan* (IMS-AIIR-B-0041-SW) (Issue No: 1.2), June 2017.
- Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).
- Solo, *Power Outage* (IMS-OPER-D-8309-SW) (Issue No: 1.0), June 2017.

**Summary of reasons for grade**

Catherine Hill Bay Water has developed an approach to the management of incidents and emergencies and that approach covers relationships with NSW Health and Central Coast Water. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.

**Discussion and notes**

The *Drinking Water Quality Plan* describes the approach to trigger and respond to drinking water quality incidents with further details being given in a supporting management plan.<sup>109</sup> Solo Water (as the retail supplier) has set up a call centre number (1300 SOLO WU) which is an internal number that covers customer enquiries. In the short term the number goes through to the Solo Water Tweed Heads head office. If the relevant number is selected by the caller the enquiry goes directly to the operator (Alan Irving). NSW Health was involved in reviewing the incident response process for the scheme.<sup>110</sup>

The chlorine dosing system is dependent on a functional power supply for its operation. Solo Water has a detailed contingency plan to respond to power outages.<sup>111</sup> The contingency plan entails utilising the three-phase power diesel generator on site at the chlorination plant to feed in via the uninterruptable power supply in the short term. Contact numbers were given in the contingency plan for these support services providers as well as Ausgrid.

<sup>109</sup> Solo, *Incident Response and Notification Management Plan* (IMS-AIIR-B-0041-SW) (Issue No: 1.2), June 2017.

<sup>110</sup> Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).

<sup>111</sup> Solo, *Power Outage* (IMS-OPER-D-8309-SW) (Issue No: 1.0), June 2017.



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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.7 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 7**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 7. The WQP (dw) outlines employee training and awareness requirements.	<b>Compliant</b>

**Risk**

Inadequate training and awareness of employees presents a risk of poor management of the drinking water supply scheme.

**Target for Full Compliance**

Adequate training and awareness of employees.

**Evidence sighted**

- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Alan Irving: Curriculum Vitae; Plumbing Licence; and Training Cards as referenced.
- Brad Irwin: Curriculum Vitae; Engineers Australia Membership Certificate; and NPER Certificate of Registration.
- Craig Heining: Curriculum Vitae; Qualification Certificates; and AWA Membership Certificate.
- Solo, *Site Supervisor – Solo Water; Position Description* (IMS-HRPR-P-6146) (Issue No: 2.0), March 2016.
- Solo, *Water and Wastewater Utility Engineer; Position Description* (IMS-HRPR-P-6228) (Issue No: 1.0), March 2017.
- Solo, *Planning and New Schemes Manager; Position Description* (IMS-HRPR-P-6233) (Issue No: 1.0), July 2017.

**Summary of reasons for grade**

Catherine Hill Bay Water has provided sufficient detail in relation to its employee training and awareness requirements for the current stage of the infrastructure. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.

**Discussion and notes**

The organisational structure in respect of the Catherine Hill Bay Water schemes is shown in the *Organisational Chart*.<sup>112</sup> Roles and responsibilities are described in summary form in the *Infrastructure Operating Plan*.<sup>113</sup> More specific responsibilities associated with particular roles are presented in detailed position descriptions. Review of a sample of position descriptions revealed that they require appropriate skills and experience, as follows:

- Planning and New Schemes Manager – responsibilities include planning new schemes, project and operations management, people management and other company roles. Skills and experience requirements include an engineering degree; a minimum of 10 years water industry experience (specifically in respect of new schemes); knowledge of planning and approval processes; and experience in water and wastewater design, development, construction and operations.<sup>114</sup>

<sup>112</sup> Solo, *Organisational Chart* (MS-OPER-G-8321-SW) (Issue No: 1.0), April 2017.

<sup>113</sup> *Infrastructure Operating Plan*, table 4-1.

<sup>114</sup> Solo, *Planning and New Schemes Manager; Position Description* (IMS-HRPR-P-6233) (Issue No: 1.0), July 2017.

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- Water and Wastewater Utility Engineer (Operations Manager) – responsibilities include product development design and engineering, project and operations management, people management and other company roles. Skills and experience requirements include an engineering degree; a minimum of 10 years water industry operations experience; and experience in water and wastewater design, development, construction and operations.<sup>115</sup>
  - Site Supervisor – responsibilities include site management and people management. Skills and experience requirements include a minimum of 2 years’ experience in a similar supervisory role.<sup>116</sup>

Review of the curriculum vitae and other relevant documentation for the incumbents of a selection of the key positions is as follows:

- Planning and New Schemes Manager (Brad Irwin) – an Environmental Engineer with 15 years relevant water industry experience, including the investigation planning and design of water and wastewater systems and integrated water management. Evidence of Engineers Australia (Chartered Professional Engineer) membership and registration on the National Professional Engineers Register was also provided.<sup>117</sup>
- Operations Manager (Craig Heininger) – a civil engineer with 25 years relevant water industry experience including roles in the development of water and wastewater infrastructure and the operation and maintenance of treatment facilities and other water industry infrastructure. Qualifications include a Bachelor of Engineering (Civil), Certificate III in Industrial Instrumentation and a Water Board Gold Medal Award (UNSW); Craig is also a member of the Australian Water Association.<sup>118</sup>
- Site Manager (Alan Irving) – a licensed plumber with almost 40 years’ industry experience, including domestic and commercial maintenance and new work, and the construction of sewer and water reticulation infrastructure. Copies of Alan’s relevant training cards were provided, including his Plumbing Licence (No: 23847); NSW Fair Trading Supervisor Certificate; Certificate III in Civil Construction (Tunnel Construction); Energy Safe Victoria Restricted Electrical Workers Licence; OH&S Industry Induction and Confined Spaces training.<sup>119</sup>
- Site Supervisor (Ross Pascoe) – a licensed plumber with more than 35 years’ experience including domestic and commercial plumbing, leading hand on commercial projects and site supervision in relation to water and sewer network construction and treatment plant construction and commissioning. Copies of Ross’ relevant training cards were provided, including his Plumbing Licence (No: 26103); NSW Fair Trading Supervisor Certificate; Queensland Building and Construction Commission Plumbing Occupational Licence; WorkSafe Victoria Licence to Perform High Risk Work; Agricultural Chemical User Permit; Equipment Operator OHS Competency Qualification; and OH&S General Induction (WorkCover NSW).<sup>120</sup>

On the basis of the sample of evidence reviewed and discussions with the abovementioned people during the audit fieldwork, it is apparent that Catherine Hill Bay Water has adequately trained persons to implement the *Drinking Water Quality Plan* and the systems in place to update and maintain that training.

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## Recommendations

There are no recommendations in respect of this obligation.

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<sup>115</sup> Solo, *Water and Wastewater Utility Engineer; Position Description* (IMS-HRPR-P-6228) (Issue No: 1.0), March 2017.

<sup>116</sup> Solo, *Site Supervisor – Solo Water; Position Description* (IMS-HRPR-P-6146) (Issue No: 2.0), March 2016.

<sup>117</sup> Brad Irwin: Curriculum Vitae; Engineers Australia Membership Certificate; and NPER Certificate of Registration.

<sup>118</sup> Craig Heininger: Curriculum Vitae; Qualification Certificates; and AWA Membership Certificate.<sup>119</sup> Alan Irving: Curriculum Vitae; Plumbing Licence; and Training Cards as referenced.

<sup>119</sup> Alan Irving: Curriculum Vitae; Plumbing Licence; and Training Cards as referenced.

<sup>120</sup> Ross Pascoe: Curriculum Vitae; Plumbing Licence; and Training Cards as referenced.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.8 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 8**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 8. The WQP (dw) outlines the process for community consultation, awareness and involvement.	<b>Compliant</b>
<b>Risk</b> Inadequate community consultation, awareness and involvement presents a risk of poor management of the drinking water supply scheme.		<b>Target for Full Compliance</b> Adequate community consultation, awareness and involvement.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo Water website: <a href="http://www.solowater.com.au/">http://www.solowater.com.au/</a>.</li> <li>▪ Solo Water, <i>Customer Contract</i> (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.</li> <li>▪ Solo Water, <i>Catherine Hill Bay; Home Owner's Manual</i> (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water/Solo Water has provided sufficient detail in relation to its process for community consultation, awareness and involvement for this scheme. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.		
<b>Discussion and notes</b>		
Information in relation to the drinking water scheme is available on the Solo Water (Catherine Hill Bay retail supplier and parent company of Catherine Hill Bay Water) website. <sup>121</sup> A copy of the Drinking Water policy is available, together with online forms that can be used to obtain further information.		
The <i>Customer Contract</i> <sup>122</sup> and <i>Home Owner's Manual</i> <sup>123</sup> also provide information in relation to the drinking water scheme, including details of the service to be provided and customers' obligations in respect of using the service. It does not appear, however, that these documents are available on the Solo Water website and, as an opportunity ( <b>OFI-CHB-LPA.003</b> ) it is suggested that Catherine Hill Bay Water /Solo Water considers publishing them both, with readily identifiable links, on the Solo Water website.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		

<sup>121</sup> Solo Water website: <http://www.solowater.com.au/>.

<sup>122</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.

<sup>123</sup> Solo Water, *Catherine Hill Bay; Home Owner's Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.

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## Opportunities for improvement

The following opportunity for improvement has been identified in respect of this obligation:

- **OFI-CHB-LPA.003:** It is suggested that Catherine Hill Bay Water/Solo Water considers publishing both the *Customer Contract* and *Home Owner's Manual*, with readily identifiable links, on the Solo Water website.
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**Table B.9 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 9**

<b>Clause</b>	<b>Requirement</b>	<b>Compliance Grade</b>
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 9. The WQP (dw) outlines the validation process for the scheme.	<b>Compliant</b>
<b>Risk</b>		<b>Target for Full Compliance</b>
Inadequate validation of processes and procedures presents a risk of poor management of the drinking water supply scheme.		Adequate methodology for validating processes and procedures to ensure that the system is effective at controlling hazards.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water has provided sufficient detail in relation to its validation process for the scheme. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.		
<b>Discussion and notes</b>		
For a scheme of this scale there isn't a great deal to validate. The raw water for the scheme, coming as it does from a potable water supply, can already be considered fit-for-purpose. Nonetheless, there are some process limits that require validation.		
The chlorination system target criteria and critical limits are validated based on the ADWG and as agreed with NSW Health. <sup>124</sup> As noted under Element 3, process limits at the chlorine CCP included a target value of 1.5 mg/L; an operational limit of <1 mg/L or > 2 mg/L; and critical limits of < 0.4 mg/L or > 3 mg/L. With respect to residual chlorine in the network a target of 0.2 mg/L has been set. Given that the raw water supplying this site is potable water from a neighbouring local government water utility, these limits are considered adequate and consistent with the ADWG.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

<sup>124</sup> Solo, *CCP Free Chlorine Management Procedure* (IMS-OPER-D-8331-SW) (Issue No: 1.0), June 2017.

**Table B.10 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 10**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 10. The WQP (dw) outlines the process management of documentation and records as well as the reporting requirements.	<b>Compliant</b>
<b>Risk</b> Inadequate documentation, records and reporting presents a risk of poor management of the drinking water supply scheme.		<b>Target for Full Compliance</b> Adequate documentation, records and reporting.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>Catherine Hill Bay Water has provided sufficient detail in relation to its process for management of documentation and records as well as the reporting requirements for this scale of infrastructure. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.</p>		
<b>Discussion and notes</b>		
<p>Catherine Hill Bay Water/Solo Water has a Citrix document management system. This Citrix System was witnessed live during the audit. Catherine Hill Bay Water was able to show a list of documents and could click on the documents and see them. The ‘current’ version of each document sought when sampling the system for evidence of documents was available. Examples viewed included:</p>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Solo, <i>Free Chlorine Field Verification Monitoring Procedure</i> (IMS-OPER-D-8301-SW) (Issue No: 1.0), June 2017, which sets out the procedure for conducting field test for free chlorine.</li> <li>▪ Solo, <i>CHB Stakeholder Register</i> (IMS-CONT-G-1679-SW) (Issue No: 1.0), April 2017, which correctly identified NSW Health, EPA, IPART and other stakeholders.</li> <li>▪ Solo, <i>CHB Water Quality Monitoring</i> (IMS-CONT-G01680-SW) (Issue No: 1.0), April 2017, a register that is used to capture records of water quality sample analyses (field and laboratory) and their review. It was noted that the “DITA” online reminder system provides a monthly reminder on the need for water quality testing.</li> <li>▪ Solo, <i>CHB Free Chlorine Field Verification</i> (IMS-CONT-G-1675-SW) (Issue No: 1.0), a register that is used to capture and monitor records of twice-weekly hand-held free chlorine field verification checks.</li> </ul>		
<p>Solo Resource Recovery, parent company of Solo Water/Catherine Hill Bay Water, has an integrated management system that is certified to ISO 9001, ISO 14001 and AS/NZS 4801 and OHSAS 18001 for its head office. The Solo Group is intending to gradually move to have that system cover other offices over time, but not all water operations are currently within the scope of the ISO systems.</p>		



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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.11 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 11**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 11. The WQP (dw) outlines the process for long-term evaluation of results and the audit of the Plan.	<b>Compliant</b>
<b>Risk</b> Inadequate long-term evaluation and audit presents a risk of poor management of the drinking water supply scheme.		<b>Target for Full Compliance</b> Adequate long-term evaluation and audit.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water has provided sufficient detail in relation to its long-term evaluation of results and the audit of the <i>Drinking Water Quality Plan</i> for the scheme at its current stage of development and scale. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.		
<b>Discussion and notes</b>		
The <i>Drinking Water Quality Plan</i> <sup>125</sup> indicates that ongoing review and evaluation of operational performance and monitoring results will be undertaken in the context of the lifecycle management strategies outlined in the <i>Infrastructure Operating Plan</i> . <sup>126</sup> These reviews will consider:		
<ul style="list-style-type: none"> <li>▪ water quality monitoring data, both at the point of supply from Central Coast Council and in the downstream (Catherine Hill Bay Water) scheme;</li> <li>▪ free chlorine characteristics, including residual levels, decay rates and the adequacy of dosing set points;</li> <li>▪ customer complaints;</li> <li>▪ incident reports; and</li> <li>▪ performance trends.</li> </ul>		
The evaluation of system performance is supported by internal audit of compliance with the provisions of the <i>Drinking Water Quality Plan</i> . Catherine Hill Bay Water has an <i>Internal Audit Procedure</i> , <sup>127</sup> (not sighted), which outlines the procedure for internal auditing of management system process and compliance. Audits are to be undertaken in accordance with a <i>Compliance Calendar</i> <sup>128</sup> (not sighted), and any non-compliances are to be managed in accordance with the <i>Corrective Action Request (CAR)</i> <sup>129</sup> procedure.		
In summary, the <i>Drinking Water Quality Plan</i> outlines the process for long-term evaluation of results and audit of the Plan.		

<sup>125</sup> *Drinking Water Quality Plan*, section 2.11.

<sup>126</sup> *Infrastructure Operating Plan*, section 6.

<sup>127</sup> Solo, *Internal Audit Procedure* (IMS-COMP-D-0835).

<sup>128</sup> Solo, *Compliance Calendar* (IMS-COMP-G-0832).

<sup>129</sup> Solo, *Corrective Action Request (CAR)* (IMS-COMP-D-0817) (Issue No: 4.1), June 2017.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table B.12 WQP (dw) Audit Table – WIC Reg Sched 1 cl.7(1)(a) – ADWG Element 12**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(a)</b>	Element 12. The WQP (dw) outlines a process for review and continual improvement.	<b>Compliant</b>
<b>Risk</b> An inadequate process for review and continual improvement a risk of poor management of the drinking water supply scheme.		<b>Target for Full Compliance</b> Adequate processes for review and continual improvement.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Solo Water, <i>Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme</i> (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.</li> <li>▪ Interviews with Catherine Hill Bay Water personnel on 4 July 2017.</li> <li>▪ Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.</li> <li>▪ Solo, <i>IPART Reporting Procedure</i> (IMS-OPER-D-8324-SW) (Issue No: 1.0), June 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
Catherine Hill Bay Water has provided sufficient detail in relation to review and continual improvement of the <i>Drinking Water Quality Plan</i> for the scheme at its current stage of development and scale. Accordingly, it is assessed that Catherine Hill Bay Water is compliant with this requirement.		
<b>Discussion and notes</b>		
<p>All documents, including Licence Plans, that sit within the integrated management system have a triggered review date that is shown on the document as well as being summarised in the document master register. Catherine Hill Bay Water stated that in general monthly reviews take place to see what’s due for review that month. Additional review may take place if a review is requested by another party (e.g. a regulator) or if the document is updated in between its routine update cycle. Catherine Hill Bay Water/Solo Water uses a “DITA” reminder system for items such as training, awareness, safety system testing and water quality monitoring. This system could be used for items such as reminding Catherine Hill Bay Water to undertake annual reports to IPART or other ongoing obligations.</p> <p>Most of the fine details of operation are in the procedures rather than the Licence Plans. Additional fine details and records are retained within living worksheets (registers) that have limited and controlled access. Those worksheets are formally identified and have their own defined review cycle.</p>		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

## **Appendix C** Detailed Audit Findings – Water Quality Plan (Non-potable Water) (WQP (npw))

Detailed audit findings in respect of the *Water Quality Plan (Non-potable Water)* (WQP (npw)) are presented in this Appendix.



**Table C.1 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 1**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 1. The WQP (npw) shows a commitment to responsible use and management of recycled water quality.	<b>Compliant</b>
<b>Risk</b> The lack of a water quality policy, up to date and accurate details for regulatory and formal requirements and contact details for stakeholders presents a small operational risk for this scheme.		<b>Target for Full Compliance</b> A water quality policy, an up to date list of regulatory and formal requirements and an up to date list of stakeholders and their contact details.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.1.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The assessment presented in Table B.1 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p> <p>It is, however, suggested (as an opportunity for improvement) that Catherine Hill Bay Water develops and publishes a <i>Recycled Water Policy</i> given its intent to promote recycled water as part of its service offering under the current scheme arrangements.</p>		
<b>Discussion and notes</b>		
Refer discussion in Table B.1.		
<p>It is noted, however, that whilst Catherine Hill Bay Water is promoting recycled water as part of its service offering (for example, recycled water is promoted on the Solo Water (parent company and retail supplier) website), it does not yet have a recycled water policy in place.</p> <p>As an opportunity for improvement (<b>OFI-CHB-LPA.004</b>), it is suggested that Catherine Hill Bay Water /Solo Water develops and publishes a Recycled Water Quality Policy notwithstanding that the recycled water network will initially be charged with potable water.</p>		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
The following opportunity for improvement has been identified in respect of this obligation:		
<ul style="list-style-type: none"> <li>▪ <b>OFI-CHB-LPA.004:</b> It is suggested that Catherine Hill Bay Water/Solo Water develops and publishes a <i>Recycled Water Quality Policy</i> notwithstanding that the recycled water network will initially be charged with potable water.</li> </ul>		

**Table C.2 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 2**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 2. The WQP (npw) includes an analysis of the recycled water system.	<b>Compliant</b>
<b>Risk</b>		<b>Target for Full Compliance</b>
Failure to adequately describe the system and assess risks could lead to risks being overlooked.		Adequate system description and risk assessment.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.2.</li> <li>▪ Solo Water, <i>Process Flow Diagram; Interim Potable System</i> (Rev 3), 11 May 2017.</li> <li>▪ Pressure Sewer Solutions, <i>Recycled Water Reticulation Master Plan Report; Catherine Hill Bay NSW</i> (Revision 3), 24 October 2013.</li> <li>▪ Solo, <i>Risk Register – Interim Scheme</i> (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The assessment presented in Table B.2 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Furthermore, the analysis of the drinking water system includes reference to the recycled water system, thereby ensuring that it is also appropriately addressed.</p> <p>Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p>		
<b>Discussion and notes</b>		
Refer discussion in Table B.2.		
In respect of the recycled water scheme, it is further noted that:		
<ul style="list-style-type: none"> <li>▪ The <i>Drinking Water Quality Plan</i><sup>130</sup> includes description of the “recycled water reticulation network” and “recycled water network plumbing” as part of the scheme infrastructure.</li> <li>▪ The <i>Process Flow Diagram; Interim Potable System</i><sup>131</sup> clearly shows that the recycled water network is to be charged with potable water under the Stage 1 (Interim Scheme) arrangements.</li> <li>▪ Although not specifically referenced, the <i>Recycled Water Master Plan</i><sup>132</sup> provides the design basis for the recycled water scheme.</li> <li>▪ Referenced design standards (for example, the Water Services Association of Australia (WSAA) <i>Water Supply Code of Australia</i>, WSA 03-2002, Hunter Water Edition, the <i>Plumbing Code of Australia</i> and AS/NZS 3500 <i>Plumbing and drainage</i>) all include requirements in respect of recycled water (as well as potable water).</li> <li>▪ The <i>Risk Register – Interim Scheme</i><sup>133</sup> appropriately identifies cross connection between the recycled and drinking water networks as a risk to drinking water quality.</li> </ul>		

<sup>130</sup> *Recycled Water Quality Plan*, section 2.2.1 (table 2.2).

<sup>131</sup> Solo Water, *Process Flow Diagram; Interim Potable System* (Rev 3), 11 May 2017.

<sup>132</sup> Pressure Sewer Solutions, *Recycled Water Reticulation Master Plan Report; Catherine Hill Bay NSW* (Revision 3), 24 October 2013.<sup>133</sup> Solo, *Risk Register – Interim Scheme* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.



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These inclusions demonstrate that, for the purposes of the Stage 1 (Interim Scheme) arrangements, the recycled water scheme is also appropriately addressed.

Importantly, the principal risks and associated preventive measures relating to dual reticulation recycled water schemes are those relating to cross-connections (including misconnections) that could lead to excessive exposure to recycled water. Since such risks and associated preventive measures are considered in Appendix B in the context of drinking water, referral to Table B.2 explains how Catherine Hill Bay Water/Solo Water has assessed and proposed to control those risks.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>133</sup> Solo, *Risk Register – Interim Scheme* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.

**Table C.3 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 3**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 3. The WQP (npw) outlines the preventive measures for water quality management.	<b>Compliant</b>
<p><b>Risk</b></p> <p>Failure to adequately define preventive measures and assess residual risks could lead to risks being overlooked.</p>		<p><b>Target for Full Compliance</b></p> <p>Adequate definition of preventive measures and residual risk assessment.</p>
<p><b>Evidence sighted</b></p> <ul style="list-style-type: none"> <li>▪ Refer Table B.3.</li> </ul>		
<p><b>Summary of reasons for grade</b></p> <p>The assessment presented in Table B.3 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p>		
<p><b>Discussion and notes</b></p> <p>Refer Table B.3.</p> <p>Importantly, the principal risks and associated preventive measures relating to dual reticulation recycled water schemes are those relating to cross-connections (including misconnections) that could lead to excessive exposure to recycled water. Since such risks and associated preventive measures are considered in Appendix B in the context of drinking water, referral to Table B.3 explains how Catherine Hill Bay Water/Solo Water has assessed and proposed to control those risks.</p>		
<p><b>Recommendations</b></p> <p>There are no recommendations in respect of this obligation.</p>		
<p><b>Opportunities for improvement</b></p> <p>No opportunities for improvement have been identified in respect of this obligation.</p>		

**Table C.4 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 4**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 4. The WQP (npw) outlines the operational procedures and process control for the scheme.	<b>Compliant</b>
<b>Risk</b>	Failure to adequately formalise procedures could lead to inconsistent operation and exposes customers to risk of poor quality water being supplied.	<b>Target for Full Compliance</b>
		Adequate detail on operational procedures to protect water quality.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>Refer Table B.4.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The assessment presented in Table B.4 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Furthermore, the referenced procedures include operational procedures in relation to the recycled water scheme (as well as the drinking water scheme).</p> <p>Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p>		
<b>Discussion and notes</b>		
Refer Table B.4.		
In respect of the recycled water scheme, it is further noted that:		
<ul style="list-style-type: none"> <li>the <i>Operator’s Manual</i><sup>134</sup> details operating and maintenance procedures in respect of the recycled water scheme.</li> <li>a <i>Suspected Cross Connection Procedure</i><sup>135</sup> is already in place; and</li> <li>the <i>Operations Workflow Checklist</i><sup>136</sup> includes daily and weekly inspection requirements for both the drinking and recycled water networks.</li> </ul>		
<p>The availability of operational procedures that address requirements in respect of the recycled water scheme demonstrates that, for the purposes of the Stage 1 (Interim Scheme) arrangements, the recycled water scheme is also appropriately addressed.</p>		
<p>Importantly, the principal risks and associated preventive measures relating to dual reticulation recycled water schemes are those relating to cross-connections (including misconnections) that could lead to excessive exposure to recycled water. Since such risks and associated preventive measures are considered in Appendix B in the context of drinking water, referral to Table B.4 explains how Catherine Hill Bay Water/Solo Water has assessed and proposed to control those risks.</p>		

<sup>134</sup> Solo Water, *Operator’s Manual; Catherine Hill Bay Water Utility; Interim Scheme* (IMS-OPER-B-8298-SW) (Revision 1.1), 6 July 2017.

<sup>135</sup> Solo, *Suspected Cross Connection Procedure* (IMS-OPER-D-8304-SW) (Issue No: 1.0), June 2017.

<sup>136</sup> Solo, *Catherine Hill Bay; Operations Workflow Checklist* (IMS-CONT-G-1683-SW) (Issue No: 1.0), May 2017.

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### **Recommendations**

There are no recommendations in respect of this obligation.

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### **Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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**Table C.5 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 5**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 5. The WQP (npw) outlines the process for verification of the water quality.	<b>Compliant</b>
<b>Risk</b> Inadequate verification presents a risk of ongoing supply of unfit recycled water over the longer term.		<b>Target for Full Compliance</b> A suitable verification program is required to ensure that ongoing monitoring and assurance takes place.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.5.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Table B.5 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.5.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

**Table C.6 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 6**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 6. The WQP (npw) includes details on the management of incidents and emergencies.	<b>Compliant</b>
<p><b>Risk</b></p> <p>The absence of an approach for handling incidents and emergencies presents a risk of poor response to incidents arising related to the recycled water supply scheme.</p>		<p><b>Target for Full Compliance</b></p> <p>An adequate management plan for incidents and emergencies.</p>
<p><b>Evidence sighted</b></p>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.6.</li> </ul>		
<p><b>Summary of reasons for grade</b></p>		
<p>The assessment presented in Table B.6 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p>		
<p><b>Discussion and notes</b></p>		
<p>Refer Table B.6.</p>		
<p><b>Recommendations</b></p>		
<p>There are no recommendations in respect of this obligation.</p>		
<p><b>Opportunities for improvement</b></p>		
<p>No opportunities for improvement have been identified in respect of this obligation.</p>		

**Table C.7 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 7**

<b>Clause</b>	<b>Requirement</b>	<b>Compliance Grade</b>
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 7. The WQP (npw) outlines operator, contractor and end user awareness and training requirements.	<b>Compliant</b>
<b>Risk</b>	<b>Target for Full Compliance</b>	
Inadequate training and awareness of employees presents a risk of poor management of the recycled water supply scheme.	Adequate training and awareness of employees.	
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>Refer Table B.7.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Table B.7 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.7.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

**Table C.8 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 8**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 8. The WQP (npw) outlines the process for community awareness and involvement.	<b>Compliant</b>
<b>Risk</b> Inadequate community consultation, awareness and involvement present a risk of poor management of the recycled water supply scheme.		<b>Target for Full Compliance</b> Adequate community consultation, awareness and involvement.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.8.</li> </ul>		
<b>Summary of reasons for grade</b>		
<p>The assessment presented in Table B.8 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Furthermore, specific information in relation to the recycled water scheme and the use of recycled water is available to customers and the broader community.</p> <p>Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.</p>		
<b>Discussion and notes</b>		
Refer Table B.8.		
In respect of the recycled water scheme, it is further noted that:		
<ul style="list-style-type: none"> <li>▪ the Solo Water website provides considerable detail in respect of its recycled water systems, including sections addressing “Benefits of recycled water”, “What you can use recycled for” and “What not to do with recycled water”.</li> <li>▪ the <i>Customer Contract</i><sup>137</sup> and <i>Home Owner’s Manual</i><sup>138</sup> both provide the end users with information regarding the recycled water system and recycled water use.</li> </ul>		
<p>The availability of information in relation of the recycled water scheme demonstrates that, for the purposes of the Stage 1 (Interim Scheme) arrangements, the recycled water scheme is also appropriately addressed.</p>		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

<sup>137</sup> Solo Water, *Customer Contract* (IMS-OPER-G-8299-SW) (Issue No: 1.0), July 2017.

<sup>138</sup> Solo Water, *Catherine Hill Bay; Home Owner’s Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.



**Table C.9 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 9**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 9. The WQP (npw) outlines the validation, research and development processes for the scheme.	<b>Compliant</b>
<b>Risk</b> Inadequate validation, research and development processes present a risk of poor management of the recycled water supply scheme.		<b>Target for Full Compliance</b> Adequate validation, research and development processes.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.9.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Table B.9 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.9.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

**Table C.10 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 10**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 10. The WQP (npw) outlines the process for management of documentation and records as well as the reporting requirements.	<b>Compliant</b>
<b>Risk</b> Inadequate documentation, records and reporting presents a risk of poor management of the recycled water supply scheme.		<b>Target for Full Compliance</b> Adequate documentation, records and reporting.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.10.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Table B.10 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.10.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

**Table C.11 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 11**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 11. The WQP (npw) outlines the process for long-term evaluation of results and the audit of the documentation.	<b>Compliant</b>
<b>Risk</b> Inadequate long-term evaluation and audit presents a risk of poor management of the recycled water supply scheme.		<b>Target for Full Compliance</b> Adequate long-term evaluation and audit.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.11.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Refer Table B.11 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.11.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

**Table C.12 WQP (npw) Audit Table – WIC Reg Sched 1 cl.7(1)(b) – AGWR Element 12**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.7(1)(b)</b>	Element 12. The WQP (npw) outlines a process for review and continual improvement.	<b>Compliant</b>
<b>Risk</b> An inadequate process for review and continual improvement a risk of poor management of the recycled water supply scheme.		<b>Target for Full Compliance</b> Adequate processes for review and continual improvement.
<b>Evidence sighted</b>		
<ul style="list-style-type: none"> <li>▪ Refer Table B.12.</li> </ul>		
<b>Summary of reasons for grade</b>		
The assessment presented in Table B.12 is applicable and appropriate for the purposes of the Stage 1 (Interim Scheme) arrangements during which the recycled water network will be charged with potable water. Accordingly, Catherine Hill Bay Water is considered to have demonstrated compliance with this requirement.		
<b>Discussion and notes</b>		
Refer Table B.12.		
<b>Recommendations</b>		
There are no recommendations in respect of this obligation.		
<b>Opportunities for improvement</b>		
No opportunities for improvement have been identified in respect of this obligation.		

## **Appendix D** Detailed Audit Findings – Sewage Management Plan (SMP)

Detailed audit findings in respect of the *Sewage Management Plan* (SMP) are presented in this Appendix.



Table D.1 SMP Audit Table – WIC Reg Sched 1 cl.14(1)(a)

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.14(1)(a)</b>	The Sewage Management Plan, in relation to the conveyance, treatment and disposal of sewage by means of infrastructure, indicates the manner in which the health and ecological assessments will be undertaken and any concerns arising from any such assessment.	<b>Compliant</b>

Risk	Target for Full Compliance
Failure to adequately describe the system and assess risks could lead to risks being overlooked.	Adequate system description and risk assessment.

#### Evidence sighted

- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Solo Water, *Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Drinking Water Quality Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3727-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Process Flow Diagram; Interim Sewage System* (Rev 2), 11 May 2017.
- Drawings No: SW-56-C-LP-2001, 2002 & 2003, *Catherine Hill Bay Residential Subdivision Stage 1; Sewer Layout Plan Work as Executed Sheets 1, 2 & 3*, signed 9 August 2016.
- Solo, *Risk Register – Interim Scheme (Sewage)* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.
- Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).
- Solo Water, *Catherine Hill Bay; Home Owner’s Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.
- Solo, *CCP Sewage Pump Out Management Procedure* (IMS-OPER-D-8306-SW) (Issue No: 1.0), June 2017.
- *Tankering Agreement* between Hunter Water Corporation and Solo Resource Recovery, dated 30 October 2015.

#### Summary of reasons for grade

The *Sewage Management Plan* indicates that hazard identification and risk assessment in relation to potential health and ecological impacts has been undertaken in accordance with guidance provided in the *Australian Guidelines for Water Recycling*. A *Risk Register – Interim Scheme (Sewage)* has been developed with input from NSW Health, which has indicated that it is satisfied with the assessment process and resultant documentation.

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Catherine Hill Bay Water demonstrated that risk mitigation measures, identified through the risk assessment process, have been implemented. These are considered appropriate for the Stage 1 (Interim Scheme) arrangements.

Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

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## Discussion and notes

### **Overview:**

The *Sewage Management Plan* has been structured to address the twelve elements of the *Australian Guidelines for Water Recycling*.<sup>139</sup> Although sewage generated within the area serviced by Catherine Hill Bay Water will ultimately be treated on site for redistribution as recycled water, under the Stage 1 (Interim Scheme) arrangements, all sewage will be managed by offsite disposal to a municipal wastewater treatment plant using a licensed road tanker service.<sup>140</sup>

### **Scheme Description:**

The sewerage system is described at an overview level<sup>141</sup> and in more detail<sup>142</sup> in the *Sewage Management Plan. A Process Flow Diagram; Interim Sewage System*<sup>143</sup> together with layout drawings for the Interim Facility (Sewage Pump Out Tank) and the reticulation system servicing Stages 1 and 2 of the development provide adequate detail to understand the scope and arrangement of the system. *The Sewage Management Plan*<sup>144</sup> refers to work as executed drawings, which provide additional detail.<sup>145</sup>

The Stage 1 (Interim Scheme) sewerage system comprises a pressure sewer collection network (which will remain as part of the ultimate scheme), together with an interim collection/pump out tank from which sewage will be disposed of by road tanker. More specifically, the scheme will comprise:

- Gravity sewers that convey sewage from up to five properties to each Pressure Sewer Unit (PSU).
- Multiple Pressure Sewer Units (PSUs), which are essentially prefabricated in-ground pits that accommodate duty and standby grinder pumps and provide up to 24 hours storage capacity. Each PSU is fitted with a monitoring and control panel, which is connected to the SCADA system, and is used to control the pumpsets and initiate alarms in response to nominated fault/failure conditions.
- A low pressure sewer network through which sewage is pumped to the Pump Out Tank.
- One or more Pump Out Tanks into which all sewage is pumped and stored until the volume warrants removal and disposal by road tanker. The Pump Out Tank(s) are sized on the basis of providing storage for a full 20 kilolitre road tanker load plus three (3) days emergency storage.

Arrangements are in place for transport by road tanker and disposal of the sewage; this is discussed in more detail in Table D.2.

### **Hazard Identification and Risk and Uncertainty Assessment:**

Hazard identification and risk assessment is addressed in the *Sewage Management Plan*,<sup>146</sup> which references conduct of a risk assessment workshop during which control strategies were identified and their impact in

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<sup>139</sup> NRMCC/EPHC/AHMC, *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)*, 2006.

<sup>140</sup> *Sewage Management Plan*, section 1.1.

<sup>141</sup> *Sewage Management Plan*, sections 1.2 and 1.3.

<sup>142</sup> *Sewage Management Plan*, section 2.2.

<sup>143</sup> Solo Water, *Process Flow Diagram; Interim Sewage System* (Rev 2), 11 May 2017 (refer *Sewage Management Plan*, appendix B).

<sup>144</sup> *Sewage Management Plan*, section 1.3.

<sup>145</sup> For example: Drawings No: SW-56-C-LP-2001, 2002 & 2003, *Catherine Hill Bay Residential Subdivision Stage 1; Sewer Layout Plan Work as Executed Sheets 1, 2 & 3*, signed 9 August 2016.

<sup>146</sup> *Sewage Management Plan*, section 2.3.



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mitigating risk assessed. Participants at the workshop, which was conducted in accordance with the guidance presented in the *Australian Guidelines for Water Recycling*, included representatives of NSW Health (Hunter New England Population Health), Catherine Hill Bay Water/Solo Water and GHD, which is considered adequate. A 12-month review and update of the risk assessment was undertaken by Catherine Hill Bay Water/Solo Water in May 2017, with a review undertaken by representatives of NSW Health (Hunter New England Population Health) and Catherine Hill Bay Water/Solo Water. A subsequent (June 2017) minor update has also been made.

The outcomes of the risk assessment workshop are documented in the *Risk Register – Interim Scheme (Sewage)*.<sup>147</sup> This indicates that, as reflected in the *Sewage Management Plan*,<sup>148</sup> the principal potential hazards/impacts associated with the scheme include:

- contaminants in the sewage (as discharged by customers);
- sewage overflow/spills at PSUs;
- sewage spills as the result of a sewer main breaks;
- sewage overflow/spills at the Pump Out Tank(s);
- odour emissions; and
- vandalism.

NSW Health had advised of its satisfaction with the documentation and the consultation process in relation to the Catherine Hill Bay Water schemes:<sup>149</sup>

*“Hunter New England Population Health acknowledges receipt of the finalised documents being:*

- *Water Quality Monitoring Procedure*
- *Incident Response and Notification Plan*
- *CCP Free Chlorine Management Procedure*
- *Free Chlorine Field Verification Monitoring Procedure*
- *Adjusting CCP free chlorine set points at Chlorine skid*
- *Free Chlorine Sampling sites*
- *Risk Register – Interim Scheme - Drinking Water May 17*
- *CCP Sewage Pump Out Management Procedure*
- *Risk Register – Interim Scheme – Sewage May 17*

*Thank you for engaging with this Office as part of the process in establishing appropriate protocols etcetera for the Catherine Hill Bay development.*

*From a health perspective, the documentation is to the satisfaction of this Office and we look forward to a continued relationship with regard to Catherine Hill Bay including any review of risk assessments and the like into the future.”*

It is noted that the referenced documentation includes the *Risk Register – Interim Scheme (Sewage)* and the *CCP Sewage Pump Out Management Procedure* (refer below).

### ***Mitigation Measures:***

Risk mitigation measures identified in the *Risk Register – Interim Scheme (Sewage)*, and which are reflected in the *Sewage Management Plan*, include (for example) the following:

- The *Home Owner’s Manual*<sup>150</sup> includes a clear listing of items (including chemicals) that should not be put down the sewer.

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<sup>147</sup> Solo, *Risk Register – Interim Scheme (Sewage)* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.

<sup>148</sup> *Sewage Management Plan*, section 2.3.1.

<sup>149</sup> Email chain between NSW Health and Catherine Hill Bay Water with entries dated 26 May 2017, 1 June 2017, 8 June 2017, 13 June 2017 and 19 June 2017 (re: *Draft Water Quality Monitoring Procedure and Incident Response and Notification Procedure*).

<sup>150</sup> Solo Water, *Catherine Hill Bay; Home Owner’s Manual* (IMS-OPER-C-8312-SW) (Issue No: 1.0), July 2017.

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- Pressure Sewer Units (PSUs) are fitted with SCADA monitoring and control to ensure sewage levels are appropriately managed, as well as 24 hours storage capacity to accommodate system outages/interruption. Contingency arrangements include the use of vacuum trucks to pump out PSUs in the event of potential overflow.
  - Stored sewage levels in the Pump Out Tank(s) are monitored via the SCADA system to ensure that transport of sewage for offsite disposal is appropriately managed. The stored sewage level has been identified as a Critical Control Point (CCP), for which target, operational and critical limits, together with corrective/preventative actions, have been nominated in the *Sewage Management Plan*<sup>151</sup> and further documented in the *CCP Sewage Pump Out Management Procedure*.<sup>152</sup> It is noted that the CCP target is based on maintaining three (3) days emergency storage in the Pump Out Tank(s).
  - Bunding is provided around the Pump Out Tank to contain any spillage; although initially considered inadequate, additional bunding has been constructed subsequent to the audit fieldwork (refer report on the New Infrastructure Audit conducted in conjunction with this audit).<sup>153</sup> Catherine Hill Bay Water advised that all water (including spilt sewage) captured on the site will be returned to the sewage tank for disposal.
  - Odour filters have been installed on the Pump Out Tank ventilation outlet and on all air release valves in the pressure sewer network (the Pump Out Tank and a sample air valve installation were sighted during the audit site inspection).
  - Procedures for response to failure conditions including sewage spill, sewer break, power loss, etc. are referenced in the *Sewage Management Plan*,<sup>154</sup> and are in place (these are discussed in more detail in Table A.3).

Considering the above, it is apparent that appropriate risk mitigation measures have been identified and, based on observations made during the audit site inspections, are in place.

### ***Sewage Quality Monitoring:***

The *Sewage Management Plan*<sup>155</sup> indicates that: “... *the quality of the raw sewage is expected to be similar to that of normal domestic wastewater with no additional contaminants of concern*”. Furthermore: “*All non-residential lots are required to enter into a Trade Waste Agreement with Solo Water to ensure wastewater is pre-treated to domestic standards prior to being discharged to into the sewerage system*”. Only one small shop (take away/convenience store) is proposed in the serviced area.

The *Sewage Management Plan*<sup>156</sup> further indicates that:

*“Raw sewage quality monitoring may be undertaken if required to refine the design of the WWTP and as is required for the Recycled Water Management Plan source water assessment that will be undertaken prior to commissioning of the WWTP.”*

It is noted that the *Tankering Agreement*,<sup>157</sup> under which sewage is to be discharged to a Hunter Water treatment facility (refer Table D.2 for further discussion) does not require monitoring of sewage characteristics. Under the terms of the *Agreement*, Solo Resource Recovery (transport agency) is required to report the source of the sewage, and the sewage may be subject to random testing by Hunter Water prior to discharge.

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<sup>151</sup> *Sewage Management Plan*, section 2.3.2 (table 2.4).

<sup>152</sup> Solo, *CCP Sewage Pump Out Management Procedure* (IMS-OPER-D-8306-SW) (Issue No: 1.0), June 2017.

<sup>153</sup> Cobbitty Consulting/Water Futures, *Catherine Hill Bay Water Utility; New Infrastructure Audit (Stage 1 – Interim Scheme) (Version 2.0)*, 16 August 2017.

<sup>154</sup> *Sewage Management Plan*, section 2.4.3 (table 2.5).

<sup>155</sup> *Sewage Management Plan*, section 2.2.2.

<sup>156</sup> *Sewage Management Plan*, section 2.5.1.

<sup>157</sup> *Tankering Agreement* between Hunter Water Corporation and Solo Resource Recovery, dated 30 October 2015.

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In summary, the *Sewage Management Plan* outlines the arrangements in relation to sewage quality monitoring.

***Review of Historical Data and Exceedances:***

The *Sewage Management Plan*<sup>158</sup> indicates that, under the Stage 1 (Interim Scheme) arrangements, sewage monitoring for performance verification purposes will involve the following, which is to be undertaken in accordance with referenced procedures:

- monitoring of pump out volumes from receipts provided by pump out contractor;
- monitoring of household connections to the sewerage system;
- estimation of sewage generation rates (L/ET/day) in dry and wet weather;
- odour complaint monitoring; and
- operational monitoring of water levels, pump run hours and alarms using SCADA.

As operation of the sewerage infrastructure had not commenced at the time of the audit, no records were available for review. Nonetheless, it was clear that appropriate processes and procedures are in place.

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**Recommendations**

There are no recommendations in respect of this obligation.

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**Opportunities for improvement**

No opportunities for improvement have been identified in respect of this obligation.

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<sup>158</sup> *Sewage Management Plan*, section 2.5.1.

**Table D.2 SMP Audit Table – WIC Reg Sched 1 cl.14(1)(b)**

Clause	Requirement	Compliance Grade
<b>WIC Reg Sched 1 cl.14(1)(b)</b>	The Sewage Management Plan, in relation to the conveyance, treatment and disposal of sewage by means of infrastructure, indicates the arrangements for the disposal of waste from the infrastructure.	<b>Compliant</b>

Risk	Target for Full Compliance
Failure to adequately make arrangements for the disposal of waste from the infrastructure presents a risk to public health and the environment.	Adequate arrangements for the disposal of waste from the infrastructure.

**Evidence sighted**

- Interviews with Catherine Hill Bay Water personnel on 4 July 2017.
- Site inspection of Stage 1 (Interim Scheme) infrastructure at Catherine Hill Bay on 4 July 2017.
- Solo Water, *Sewage Management Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-ENVM-B-3728-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Infrastructure Operating Plan; Catherine Hill Bay Water Utility Interim Scheme* (reference: IMS-OPER-B-8297-SW) (Revision 1.0), 13 June 2017.
- Solo Water, *Process Flow Diagram; Interim Sewage System* (Rev 2), 11 May 2017.
- Solo, *CCP Sewage Pump Out Management Procedure* (IMS-OPER-D-8306-SW) (Issue No: 1.0), June 2017.
- Solo, *Catherine Hill Bay; Operations Workflow Checklist* (IMS-CONT-G-1683-SW) (Issue No: 1.0), May 2017.
- Solo Resource Recovery, *Terms of Service Agreement*, 15 February 2016 (in relation to liquid waste removal).
- *Tankering Agreement* between Hunter Water Corporation and Solo Resource Recovery, dated 30 October 2015.
- Solo, *Risk Register – Interim Scheme (Sewage)* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.

**Summary of reasons for grade**

The arrangements in respect of the management of waste streams arising as a result of the conveyance, treatment and disposal of sewage, which for the purposes of the Stage 1 (Interim Scheme) arrangements include the off-site disposal of sewage and odours generated by the sewage, are effectively documented in the *Sewage Management Plan* and supporting documentation. Accordingly, Catherine Hill Bay Water is assessed to have demonstrated compliance with this obligation.

**Discussion and notes**

As reported in Table D.1, the *Sewage Management Plan* and *Process Flow Diagram; Interim Sewage System*<sup>159</sup> (which is included as an Appendix to the *Sewage Management Plan*), describe the sewerage system in detail.

As noted, under the Stage 1 (Interim Scheme) arrangements, all sewage will be pumped via a pressure sewer collection network to an interim collection/pump out tank from which sewage will be disposed of

<sup>159</sup> Solo Water, *Process Flow Diagram; Interim Sewage System* (Rev 2), 11 May 2017 (refer *Sewage Management Plan*, appendix B).

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by road tanker. Under this arrangement, the sewage generated within the scheme can be considered as a waste stream.

The *Sewage Management Plan* references the *CCP Sewage Pump Out Management Procedure*<sup>160</sup> which details arrangements for the disposal of sewage. This procedure:

- requires daily inspection of the Pump Out Tank facility and monitoring of storage levels in the SCADA; these requirements are captured in the *Operations Workflow Checklist*;<sup>161</sup>
- identifies operational and critical limits in respect of tank storage level, together with corrective and preventative actions in each case; although limits set in the SCADA were not reviewed, Catherine Hill Bay Water personnel clearly explained the arrangements during the audit;
- references relevant documentation including management plans, a manual, procedures, a form and a drawing, all of which were in place (and available to the auditor for review).

Catherine Hill Bay Water also has a *Service Agreement*<sup>162</sup> with Solo Resource Recovery (parent company of Solo Water) in relation to the transport and disposal of sewage. Solo Resource Recovery, in turn, has a *Tankering Agreement*<sup>163</sup> with Hunter Water for the disposal of sewage into its system.

Odour generated by sewage can also be considered as a waste stream for the purposes of this assessment. This is reflected in the *Sewage Management Plan*,<sup>164</sup> which indicates that odour is identified as a hazard in the *Risk Register – Interim Scheme (Sewage)*.<sup>165</sup>

Odour complaint monitoring is identified as one of the performance verification measures for the Stage 1 (Interim Scheme) sewage management arrangements,<sup>166</sup> thereby providing a mechanism (other than operator observation) to ensure that odours are being effectively managed.

In summary, arrangements in respect of the management of waste streams arising as a result of the conveyance, treatment and disposal of sewage, are effectively documented in the *Sewage Management Plan* and supporting documentation.

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## Recommendations

There are no recommendations in respect of this obligation.

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## Opportunities for improvement

No opportunities for improvement have been identified in respect of this obligation.

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<sup>160</sup> Solo, *CCP Sewage Pump Out Management Procedure* (IMS-OPER-D-8306-SW) (Issue No: 1.0), June 2017.

<sup>161</sup> Solo, *Catherine Hill Bay; Operations Workflow Checklist* (IMS-CONT-G-1683-SW) (Issue No: 1.0), May 2017.

<sup>162</sup> Solo Resource Recovery, *Terms of Service Agreement*, 15 February 2016 (in relation to liquid waste removal).

<sup>163</sup> *Tankering Agreement* between Hunter Water Corporation and Solo Resource Recovery, dated 30 October 2015.

<sup>164</sup> *Sewage Management Plan*, section 2.3.

<sup>165</sup> Solo, *Risk Register – Interim Scheme (Sewage)* (IMS-ENVM-G-3635-SW) (Revision 2.1), 6 June 2017.

<sup>166</sup> *Sewage Management Plan*, section 2.5.





