RISK MANAGEMENT PLAN

RAW WATER SUPPLY OEMP – ATTACHMENT A

SEPTEMBER 2016
## Revision History

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date</th>
<th>Details</th>
<th>Authorised</th>
</tr>
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<tr>
<td>1.0</td>
<td>08/04/16</td>
<td>Draft for review</td>
<td>M Haege/Geolyse</td>
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<tr>
<td>2.0</td>
<td>09/05/16</td>
<td>Issue for implementation</td>
<td>M Haege/Geolyse</td>
</tr>
<tr>
<td>2.1</td>
<td>22/09/16</td>
<td>Minor edits</td>
<td>M Haege/Geolyse</td>
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</table>

### Risk Management Plan

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ABBREVIATIONS

AEMP  Aquatic Environmental Monitoring Program
AHD Australian height datum
AMS  Adaptive management strategy
ANZECC  Australian and New Zealand Environment and Conservation Council
ARMCANZ  Agriculture and Resource Management Council of Australia and New Zealand
BSCSHP  Blackmans Swamp Creek stormwater harvesting scheme
CCS  Community communication strategy
CTF  Cease to flow
CoA  Condition of approval
DEE  Department of Environment and Energy
DST  Decision Support Tool
DPI  Department of Primary Industries
DPI Water  Department of Primary Industries Water
DSEWPC  Department of Sustainability, Environment, Water, Population and Communities (now DEE)
EA  Environmental Assessment
EP&A Act  NSW Environmental Planning and Assessment Act 1979
GL  Gigalitre (1,000 megalitres)
GMP  Groundwater monitoring program
ha  Hectares
HMP  Hydrology monitoring program
IMP  Inspection and maintenance plan
kL  Kilolitre (1,000 litres)
km  Kilometre (1,000 metres)
kWhr  Kilowatt hour
L  Litre (1,000 millilitres)
LGA  Local Government Area
L/s  Litres per second
m²  Cubic metre (1,000 litres)
m³/hr  Cubic metres per hour
m³/s  Cubic metres per second
mg/L  Milligrams per litre
mL  Millilitre
ML  Megalitre (1 million litres or 1,000 kilolitres)
ML/day  Megalitres per day
m  Metre
mm  Millimetre
MOP  Macquarie River to Orange pipeline
OCC  Orange City Council
OEMP  Operation Environmental Management Plan
PA  Project approval
PCSHS  Ploughmans Creek stormwater harvesting scheme
ScWMP  Scour water management plan
SEP  Stakeholder engagement plan
STP  Sewage treatment plant
µg/L  Micrograms per litre
µS/cm  Micro Siemens per centimetre
WAL  Water access licence
WFP  Water filtration plant
WSP  Water sharing plan
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Risk Management

1.1 INTRODUCTION

This Risk Management Plan (RMP) forms part of the Orange Raw Water Supply Operational Environmental Monitoring Plan (OEMP). It describes how Orange City Council has assessed risk and the relevant controls proposed.

1.2 RISK MANAGEMENT FRAMEWORK

The risk rating is a factor of the consequence of an impact occurring and the likelihood of the impact occurring. Depending on the combination of consequence and likelihood, the overall risk rating could be low to very high. Very high risks (termed ‘key risks’) have warranted a higher level of control.

1.2.1 CONSEQUENCE

A consequence is the outcome (impact) of an event as described in Table 1.1.

<table>
<thead>
<tr>
<th>Level</th>
<th>Likelihood</th>
<th>Example description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Negligible</td>
<td>Negligible impact, little disruption to normal operation, low increase in normal operation costs.</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>Minor impact for small population, some manageable operation disruption, some increase in operating costs.</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Minor impact for large population, significant modification to normal operation but manageable, operation costs increased, increased monitoring.</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required.</td>
</tr>
<tr>
<td>5</td>
<td>Severe</td>
<td>Severe impact for large population, complete failure of systems.</td>
</tr>
</tbody>
</table>

1.2.2 LIKELIHOOD

Likelihood is the chance that something might happen. The information provided in the Table 1.2 is used to determine the likelihood of identified risks.
### 1.3 RISK MATRIX

The rating of risks is evaluated using the matrix in Table 1.3. The scoring of risk is a subjective process. When assessing the likelihood and consequence of a particular risk, the following information is considered:

- The environmental impact assessment and suggested mitigation measures;
- Results of site audits or observations;
- Past history and similar occurrences and situations; and
- Review of relevant documentation and data.

The risk level actions are:

1. Immediate action
2. Action within one week
3. Action within one month
4. Monitor
5. Monitor

<table>
<thead>
<tr>
<th>LIKELIHOOD</th>
<th>CONSEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negligible</td>
</tr>
<tr>
<td>Almost certain</td>
<td>5</td>
</tr>
<tr>
<td>Likely</td>
<td>5</td>
</tr>
<tr>
<td>Possible</td>
<td>5</td>
</tr>
<tr>
<td>Unlikely</td>
<td>5</td>
</tr>
<tr>
<td>Rare</td>
<td>5</td>
</tr>
</tbody>
</table>
1.4 RISK REGISTER

A register of operation environmental hazards, the anticipated level of risk and relevant control measure is provided in Appendix A.

This register shall be updated as required during operation if new environmental hazards are identified or environmental controls altered.

1.5 RMP REVIEW

1.5.1 REVISION TO STRATEGIES, PLANS AND PROGRAMS

CoA C6 requires that OCC shall review, and if necessary revise, strategies, plans and programs included in the OEMP to the satisfaction of the Director-General within 3 months of:

a) the Annual Review (Section 4.4 – OEMP Reporting);

b) any Incident Report (Section 3.2.18 – Environmental Incident Management);

c) an Audit Report (Section 4.3 – Environmental Auditing and Compliance); or

d) any modification to the conditions of the Project Approval,

This is to ensure that plans and programs are updated on a regular basis, and incorporate any recommended measures to improve environmental performance.

1.5.2 DOCUMENT CONTROL

The following will be classed as ‘major’ revisions:

• Changes to processes;

• Changes to monitoring programs, either timing or parameters monitored;

• Changes made in response to an incident; and/or

• Changes requested by a relevant Government agency.

Major revisions will be identified by the whole number in the version number (i.e. 1.0, 2.0, 3.0...) and will be reviewed, approved and re-circulated as necessary.

The following will be classed as ‘minor’ revisions:

• Minor typing and grammar corrections;

• Changes to position titles; and

• Updates to recording forms to suit changes in operations.

Minor revisions will be identified by the decimal point in the version number (i.e. 1.1, 2.2, 3.3...) and will not require review and approval prior to re-circulation.

Major and minor revisions will be listed in the Revision History at the front of this document.
Appendix A – Risk Register
## OCC Raw Water System: RISK REGISTER

### Version 2.1: 22 September 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>Risk Management Area</th>
<th>Cause</th>
<th>Effect/Impact</th>
<th>Controls</th>
<th>Current Risk Rating</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extraction Volume</td>
<td>Ineffective management and monitoring of extraction volumes.</td>
<td>Exceed water share listed on the various Water Access Licences.</td>
<td>OEMP Section 3.2.1 Extraction Volume Hydrology Monitoring Program</td>
<td>1</td>
<td>Negligible C Possible 1C 5 Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>2</td>
<td>Operating Rules</td>
<td>Not complying with approved operating conditions.</td>
<td>Departure from approved operating conditions causing changes to creek and river flow regimes that are different to the predictions made in the various assessment documents.</td>
<td>OEMP Section 3.2.2 Operating Rules Decision Support Tool</td>
<td>3</td>
<td>Moderate D Unlikely 3D 4 Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>3</td>
<td>Gauging Stations</td>
<td>Inadequate maintenance/monitoring of gauging stations.</td>
<td>Gauging stations do not accurately reflect flow and incorrectly trigger harvest operations.</td>
<td>OEMP Section 3.2.3 Gauging Stations Hydrology Monitoring Program</td>
<td>2</td>
<td>Minor D Unlikely 2D 5 Water Treatment Manager</td>
</tr>
<tr>
<td>4</td>
<td>Environmental Water Quality</td>
<td>Ineffective management and monitoring of water quality.</td>
<td>Deterioration of surface and groundwater quality. Impact on aquatic habitat.</td>
<td>OEMP Section 3.2.4 Water Quality Aquatic Environment Monitoring Program</td>
<td>3</td>
<td>Moderate D Unlikely 3D 4 Water Treatment Manager</td>
</tr>
<tr>
<td>5</td>
<td>Drinking water quality</td>
<td>Drinking water quality targets for external sources not met. Lack of monitoring and control.</td>
<td>Impact on raw water quality in Suma Park Dam that compromises drinking water quality.</td>
<td>OEMP Section 3.2.4 Water Quality OCC Drinking Water Management System</td>
<td>3</td>
<td>Moderate E Rare 3E 4 Water Treatment Manager</td>
</tr>
<tr>
<td>6</td>
<td>Aquatic Ecology</td>
<td>Ineffective management and monitoring of water quality and hydrology.</td>
<td>Alteration to feeding and spawning habitats, entrainment during offtake operation, and indirect impacts to habitat as a result of changes to water quality and flow.</td>
<td>OEMP Section 3.2.5 Aquatic Ecology Aquatic Environment Monitoring Program</td>
<td>3</td>
<td>Moderate E Rare 3E 4 Water Treatment Manager</td>
</tr>
<tr>
<td>7</td>
<td>Environmental Flow Rules</td>
<td>Lack of monitoring. System failure.</td>
<td>Do not comply with approval conditions.</td>
<td>OEMP Section 3.2.6 Environmental Flow Rules Hydrology Monitoring Program</td>
<td>2</td>
<td>Minor D Unlikely 2D 5 Water Treatment Manager</td>
</tr>
<tr>
<td>8</td>
<td>Groundwater Management</td>
<td>Ineffective management and monitoring of groundwater levels and quality.</td>
<td>Deterioration of groundwater quality. Impact on other groundwater users through reduction in water levels.</td>
<td>OEMP Section 3.2.7 Groundwater Management Groundwater Monitoring Program</td>
<td>2</td>
<td>Minor D Unlikely 2D 5 Water Treatment Manager</td>
</tr>
<tr>
<td>9</td>
<td>Terrestrial Ecology</td>
<td>Scour water discharge.</td>
<td>Downstream or downstream habitat sedimentation, and modification of vegetation composition in the long-term (if releases occur periodically).</td>
<td>OEMP Section 3.2.8 Terrestrial Ecology Scour Water Management Plan Inspection and Maintenance Plan</td>
<td>2</td>
<td>Minor D Unlikely 2D 5 Water Treatment Manager</td>
</tr>
<tr>
<td>10</td>
<td>Stakeholder Engagement</td>
<td>Ineffective communication with stakeholders.</td>
<td>Misinformation in the community. Disgruntled community.</td>
<td>OEMP Section 3.2.9 Stakeholder Management Stakeholder Engagement Plan</td>
<td>2</td>
<td>Minor D Unlikely 2D 5 Water and Sewer Strategic Manager</td>
</tr>
<tr>
<td>11</td>
<td>Air Quality</td>
<td>Dust generation from maintenance crews traversing unsealed roads and the easement.</td>
<td>Infrequent impacts to air quality due to dust generation.</td>
<td>OEMP Section 3.2.10 Air Quality Inspection and Maintenance Plan</td>
<td>1</td>
<td>Negligible C Possible 1C 5 Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>Number</td>
<td>Risk Management Area</td>
<td>Cause</td>
<td>Effect/Impact</td>
<td>Controls</td>
<td>Current Risk Rating</td>
<td>Responsible Person</td>
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<tr>
<td>--------</td>
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<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Noise and Vibration</td>
<td>Operational traffic, and inadequate maintenance/monitoring of noise-generating infrastructure.</td>
<td>Impact on local noise amenity.</td>
<td>OEMP Section 3.2.11 Noise and Vibration</td>
<td>2 Minor D Unlikely 2D 5</td>
<td>Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>13</td>
<td>Land Use</td>
<td>Impact on landuse during operation and maintenance.</td>
<td>Decreased development potential of land within the easement due to restrictions included in the acquisition agreement between Landowners and Council.</td>
<td>OEMP Section 3.2.12 Land Use Inspection and Maintenance Plan Stakeholder Engagement Plan</td>
<td>2 Minor D Unlikely 2D 5</td>
<td>Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>14</td>
<td>Traffic Management</td>
<td>Operational traffic.</td>
<td>Minor traffic and road impacts.</td>
<td>OEMP Section 3.2.13 Traffic Management Inspection and Maintenance Plan</td>
<td>1 Negligible C Possible 1C 5</td>
<td>Water and Sewer Strategic Manager</td>
</tr>
<tr>
<td>16</td>
<td>Visual Amenity</td>
<td>Maintained cleared vegetation and surface infrastructure such as pumping stations and ancillary services</td>
<td>Change to local visual environment.</td>
<td>OEMP Section 3.2.14 Visual Amenity</td>
<td>2 Minor D Unlikely 2D 5</td>
<td>Water and Sewer Strategic Manager</td>
</tr>
<tr>
<td>17</td>
<td>Contamination and Soils</td>
<td>Scour water and contamination</td>
<td>Erosion and soil contamination</td>
<td>OEMP Section 3.2.15 Contamination and Soils Scour Water Management Plan</td>
<td>2 Minor D Unlikely 2D 5</td>
<td>Water Treatment Manager</td>
</tr>
<tr>
<td>18</td>
<td>Waste Management</td>
<td>Scour water and sediments generated by infrequent cleaning and dewatering requirements.</td>
<td>Impacts to water quality.</td>
<td>OEMP Section 3.2.16 Waste Management Scour Water Management Plan</td>
<td>1 Negligible D Unlikely 1D 5</td>
<td>Water Treatment Manager</td>
</tr>
<tr>
<td>19</td>
<td>Complaints Management</td>
<td>Not following procedures.</td>
<td>Disgruntled community, Lack of feedback and follow up.</td>
<td>OEMP Section 3.2.17 Complaints Management Stakeholder Engagement Plan</td>
<td>2 Minor D Unlikely 2D 5</td>
<td>Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>20</td>
<td>Environmental Incident</td>
<td>Not following procedures.</td>
<td>No continual improvement. OEMP not updated.</td>
<td>OEMP Section 3.2.18 Environmental Incident Management Adaptive Management Strategy</td>
<td>3 Moderate D Unlikely 3D 4</td>
<td>Water and Sewerage Strategic Manager</td>
</tr>
<tr>
<td>21</td>
<td>Non compliance with OEMP</td>
<td>Lack of personnel training. Lack of monitoring. Lack of auditing.</td>
<td>Non compliance with OEMP and possible environmental impact.</td>
<td>OEMP Section 3.2.18 Environmental Incident Management OEMP Section 4.3 Environmental auditing and compliance Adaptive Management Strategy OEMP Section 2.5 Environmental Training</td>
<td>3 Moderate E Rare 3E 4</td>
<td>Water and Sewerage Strategic Manager</td>
</tr>
</tbody>
</table>

**Risk Level Actions:**
1. Immediate action
2. Action within 1 week
3. Action within 1 month
4. Monitor
5. Monitor