

# Victorian Desalination Project



CESP - Attachment I.1 - Commissioning Environmental Risk Register

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**COMMISSIONING  
ENVIRONMENTAL RISK REGISTER**

| Risk #  | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |     |
|---|---|---|---|--|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|-----|
| <p>Definitions for consequence, probability and other abbreviations in this register can be found in the Risk (Aspects) Register and Risk Matrix</p>                        |   |   |   |  |             |             |                                 |  |               |             |             |                                |     |
| <p><b>Marine Tunnels and Sea Water Lift Pump Station Commissioning</b><br/>(NB. Flooding of Intake and Outlet Tunnels is covered under the existing Marine D&amp;C EMP)</p> |   |   |   |  |             |             |                                 |  |               |             |             |                                |     |
| 1   | Start up and commissioning of Sea Water Lift Pump.                            | Marine Flora and Fauna - Intake.<br><br>Prevent entry of Penguins and other diving birds into the intake structure.<br><br>Limit entrainment of marine biota.                                 | Start up and operation of pump potentially entraining marine flora and fauna.   | Potential loss of Marine flora and fauna individuals or biodiversity through entrainment into the marine intake. Includes changes to recruitment and marine community structure. | D           | 3           | D3                              | Moderate<br><br>Control measures include:<br>Design - The design of the intake structure grill sized at 50mm precludes marine mammals and other large marine organisms.<br>Design - The design of the SWLP system allows for flows of no greater than 0.15m/s across the intake grilles.<br><br>Commissioning<br>• Monitoring of the screenings backwash differential pressure and frequency will be undertaken from the commencement of the Screening process.<br>• All screenings will be sent via the munchers to the Sludge System feed.<br>• The sludge system is capable of catering for a predicted worst case scenario of 100kg/day of screened material.<br>• Seawater intake is not sent to the Screen and feed until commencement of Pre-Treatment Commissioning.   | G             | D           | 2           | D2                             | Low |
| 2   | Start up and commissioning of Sea Water Lift Pump and bypass water to outlet. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Initial discharge of seawater with high pH due to leaching of Calcium from tunnel concrete lining.  | Potential loss of Marine flora and fauna individuals or biodiversity through pollution of the marine environment due to the release of contaminants/off specification water.     | D           | 3           | D3                              | Moderate<br><br>Control measure:<br>- During initial start-up, commission pumps in recirculation mode to ensure zero discharge. when pumps are operational, the seawater is bypassed from inlet to outlet via the bypass penstocks.<br>- When pumps are commissioned, run multiple pumps to achieve high flow rate (equiv. to 100GL/a desalinated water flow) to ensure good dispersion pH water at the outlet structures.<br>- No treatment or processing of the seawater is to occur during this process.<br>- CFD modelling performed at worst case (rise of pH to 12) and simulated with the discharge flow mentioned above. The simulation demonstrated that the discharge water reaches ambient pH within a few meters of the discharge nozzle.<br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00). | G             | D           | 2           | D2                             | Low |
| 3   | Start up and commissioning of Sea Water Lift Pump and bypass water to outlet. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Leaks from pumps (e.g. ~8.6L of food grade oil in seal chamber of each pump) could potential slowly discharged to the marine environment. | Potential loss of Marine flora and fauna individuals or biodiversity through pollution of the marine environment.  | C           | 2           | C2                              | Moderate<br><br>Control measures include:<br>- Inspection of pump prior to installation to ensure no visible signs of oil leakage.<br>- Hard interlock of oil/water sensor within pump seal chamber which stops the pump and triggers an alarm (which trigger an operator response and corrective action procedures as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00)).<br>- limited quantity of oil in seal chamber of pump.   | VG            | D           | 2           | D2                             | Low |
| 4   | Start up and commissioning of Sea Water Lift Pump and bypass water to outlet. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Increased turbidity due to construction debris remaining in tunnels being discharged to the marine environment.                           | Potential harm to marine flora and fauna from increased turbidity.   | C           | 3           | C3                              | High<br><br>Control measures include:<br>- Cleaning of tunnel prior to flooding.<br>- Final inspection and cleaning of pump station prior to flooding.   | VG            | E           | 2           | E2                             | Low |



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|--------|---|---|--|---|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|
| 5      | Start up and commissioning of Sea Water Lift Pump and bypass water to outlet. | Airborne noise.<br><br>Minimise impacts from airborne noise.  | Commissioning of SWLP creating an airborne noise source.   | SWLP creating a noise source that impacts upon neighbourhood amenity. | D           | 3           | D3 Moderate                     | Control measures include:<br>Design: The design and selection of pump ensure that there is no airborne noise emitted during operation<br>Design: Concrete cover over the seawater lift pump station reduces noise emission generated from water flowing over weirs etc | VG            | E           | 2           | E2 Low                         |
| 6      | Start up and commissioning of Sea Water Lift Pump and bypass water to outlet. | Underwater noise and vibration.<br><br>Compliance with EBPC Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales.<br><br>No Significant impact outside any marine exclusion zone on marine diving activities. | Commissioning of SWLP creating an underwater noise source. | Potential discomfort to recreational users and marine cetaceans.      | D           | 3           | D3 Moderate                     | Control measures include:<br>Design: Design and selection of pump ensures compliance with performance requirement for underwater noise.<br>Commissioning: Assessment of underwater noise in accordance with the Environmental Noise Assessment (COMM 051).             | VG            | D           | 2           | D2 Low                         |



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|------------------------------------|---|---|---|---|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|-----|
| 7                                  | Start up and commissioning of Sea Water Lift Pump.  | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Insufficient flow during commissioning to enable mixing in the marine environment   | Adverse effects to marine flora and fauna.  | C           | 2           | C2                              | Moderate<br><br>Control measure:<br>- During commissioning, operate bypass at seawater lift pump station to ensure minimum flow to outlet tunnel equivalent to one stream of brine discharge.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).   | F             | D           | 2           | D2                             | Low |
| <b>Pre-Treatment Commissioning</b> |   |   |   |   |             |             |                                 |  |               |             |             |                                |     |
| 8                                  | Commissioning of pre-treatment and sludge chemical systems, sodium hypochlorite, sodium bisulphite, Ferric Sulphate, Coagulant aid, sulphuric Acid. | Minimise Use of chemicals.<br><br>Minimise adverse affects of chemicals on the receiving environment.   | Potential for unwanted chemical spills/leaks due to malfunction of components during commissioning leading to localised contamination of soil or groundwater/surface water. | Localised contamination of soils or groundwater/surface water systems affecting groundwater/surface water systems downstream of the plant site. | C           | 2           | C2                              | Moderate<br><br>Control measures include, but are not limited to:<br>Design:<br>Design focus on maximising safety and minimising potential to cause environmental impact.<br>- All concentrated chemicals are housed within designated bunded areas.<br>- All truck unloading areas are designed to capture any spills from truck unloading operations.<br>- Chemical pipe works outside buildings are in culverts or double contained if direct buried.<br>Commissioning:<br>- Pipes will be hydrostatically tested to ensure integral and eliminate the chance of leakage.<br>- Systems are tested with water first to ensure correct interlock, control and functionality. Systems are then dried with air prior to introduction of chemicals.<br>- The above will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Handling of chemicals, including spill cleanup, to occur in accordance with MSDS as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br>- Staff trained in the appropriate management of Hazardous materials and response to spills in accordance with the D&C PGA and Utilities EIRPs as appropriate. | VG            | E           | 2           | E2                             | Low |
| 9                                  | Commissioning of pre-treatment and sludge chemical systems, sodium hypochlorite, sodium bisulphite, Ferric Sulphate, Coagulant aid, sulphuric Acid. | Use of chemicals.<br><br>Minimise adverse affects of chemicals on the receiving environment.  | Potential for incorrect chemical dosage due to malfunction of equipment leading to discharge of out of specification water.   | Adverse effects to marine flora and fauna.  | C           | 2           | C2                              | Moderate<br><br>Control measures include, but are not limited to:<br>Design:<br>Design focus on maximising safety and minimising potential to cause environmental impact.<br>- Closed loop control of dosing equipment.<br>- Automatic stopping of dosing system if there is instrument or control failure.<br>Commissioning:<br>- Calibration of instruments at intervals required by manufacturer.<br>- Control sequence is tested with water prior to introduction of chemicals.<br>- Systems are tested with water first to ensure correct interlock, control and functionality. Systems are then dried with air prior to introduction of chemicals.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).  | VG            | E           | 2           | E2                             | Low |



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| 10     | Transport & unloading of pre-treatment and sludge chemicals. (Ferric Sulphate, Sulphuric Acid, Coagulant Aid, Sodium Bisulphide, Sodium Hypochlorite). | Use of chemicals.<br><br>Minimise adverse affects of chemicals on the receiving environment. | Chemicals spills during truck unloading, leading to chemical spill. | Localised contamination of soils or groundwater/surface water systems affecting surface water and groundwater systems downstream of the plant site. | C           | 3           | C3 High                         | <p>Unloading of bulk chemicals will be within designated bunded areas and follow Operating Procedures. Refer to list of operating procedures in Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00)</p> <p>Any spill within the truck unloading and bunded areas will be contained, tested and disposed in accordance with appropriate operating procedures.</p> <p>Control measures include, but are not limited to:</p> <p>Design</p> <ul style="list-style-type: none"> <li>- Storage of chemicals as per the Plant Wide Process Design (DP2-0001).</li> <li>- Each chemical storage tank used on the plant is contained within a dedicated bunded area. Any spills or leaks from within the bund will be captured, assessed and disposed of in accordance with Operating Procedures.</li> <li>- Tanks have level transmitter and high level switches to interlock feed system and prevent overfilling.</li> <li>- Storage tanks are within bunded area so overflow will be contained.</li> <li>- Truck will be located within designated unloading bund during the unloading operation.</li> <li>- Bund for truck unloading area is designed to contain volume of tanker compartment.</li> </ul> <p>Commissioning</p> <ul style="list-style-type: none"> <li>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of leaks.</li> <li>- Tested sequence ensure that the likelihood of chemical spillage from malfunction of instruments is minimised.</li> <li>- Transport, storage and handling of pre-treatment chemicals for commissioning will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&amp;C PGA EMP).</li> <li>- Staff trained in the appropriate management of Hazardous materials and response to spills in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00)).</p> | VG            | D           | 2           | D2                             | Low |



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|--------|--|---|---|--|-------------|-------------|---------------------------------|--|--|-------------|-------------|--------------------------------|----|-----|
| 11     | Use of pre-treatment and sludge chemicals. (Ferric Sulphate, Sulphuric Acid, Coagulant Aid, Sodium Bisulphide, Sodium Hypochlorite). | Use of chemicals.<br>Minimise adverse affects of chemicals on the receiving environment.  | Malfunction of equipment leading to over dosing of chemicals and potential for unwanted discharge of process refuse with higher chemical content into the marine environment. | Potential to cause adverse affects on marine flora and fauna.  | C           | 3           | C3                              | High   | Control measures include, but are not limited to:<br>Design:<br>- Dosing of chemicals is under closed-loop control which reduce chemical use when set point is approached and stops chemical dose when control set point is breached.<br>Commissioning:<br>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise the risk of malfunction.<br>- Tested sequence to ensure that the likelihood of chemical dosing control system malfunction is minimised.<br><br>Commissioning will be implemented as per the General Commissioning Procedure for Chemical Dosing Systems (COMM-STD-00-PRD-005).  | VG          | E           | 2                              | E2 | Low |
| 12     | Commissioning of Drum Screen and solid disposal via the dewatering screw and skips.  | Surface Water Quality.<br>Minimise impacts on surface water quality.<br>Comply with State Environment Protection Policy (Waters of Victoria).<br>Achieve the Urban Stormwater Best Practice Environmental Management Guidelines performance objectives during construction. | Leaks from the dewatering screw or skip.  | Potential runoff of seawater onto the ground resulting in local contamination of soil and subsequent potential contamination of groundwater/surface water systems. | C           | 2           | C2                              | Moderate   | Control measures include:<br>Design:<br>- Dewatering screw and skip are located within a concrete hardstand which slopes toward a sump.<br>- Water collected in the sump is pumped back to the screen and feed diffuser.<br>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&C PGA and Utilities EIRPs as appropriate.  | G           | C           | 1                              | C1 | Low |
| 13     | Commissioning of Drum Screen and solid disposal via the dewatering screw and skips.  | Neighbourhood amenity - odour.  | Organic solids decompose in the skips causing odour emission.   | Odour at receptor.   | C           | 2           | C2                              | Moderate   | It is not planned to use the dewatering screw during commissioning, and the dewatering screw can be commissioned without any solids.<br>Other control measures enacted, in the event that solid disposal via the dewatering screw and skips occurs, include:<br>- Skip is covered to minimise fugitive emission of odour.<br>- Regular removal of the skip and appropriate disposal of the waste solids off site.<br>- Daily inspection of skip to ensure it is not overfilled or odorous.   | VG          | D           | 2                              | D2 | Low |
| 14     | Commissioning of the Sludge System.  | Marine Flora and Fauna - Outlet.<br>Comply with the State Environment Protection Policy (Waters of Victoria).<br>No observable accumulation of solid matter or staining on the beach.   | Clarified water / supernatant with higher concentration of chemical or turbid supernatant is discharged from Densadeg clarifiers into the outfall and marine environment.     | Unwanted discharge into the marine environment causing adverse affects on marine flora and fauna.  | C           | 2           | C2                              | Moderate   | Control measures include, but are not limited to:<br>- Chemical use to promote coagulation of suspended solids and is settled with the sediments.<br>- Dosing of chemicals into the Sludge Treatment system is automatically controlled to the required flow rate, the flow settings also have warning level that triggers a system response, and alarms levels which trigger an operator response and corrective action procedures. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Excess chemical flow will slow down the chemical feed pump automatically.<br>- Turbidity of the clarified water from the Densadeg is measured and controlled by regulating the injection of chemicals<br>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of leaks and ensure correct functionality prior to introduction of chemicals.<br>- Jar tests during commissioning to verify and optimise chemical dose rates.<br>- Water quality at outfall will be monitored and alarmed by the online water quality monitoring with dual redundancy (primary and secondary monitoring instrument systems) including real time alarms.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00) | VG          | E           | 2                              | E2 | Low |



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| 15     | Commissioning of the Sludge System. | Hazardous Materials.  | Improper or hazardous sludge produced during initial commissioning stage causing difficulty in management of solid waste (disposal from solid waste skips). | Disposal of waste to the incorrect offsite facility. | C           | 3           | C3 High                         | <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Extract sludge from a lower extraction point in the clarifier with higher solid content to ensure centrifuge feed has sufficient solids.</li> <li>- Sludge Tank can be used to build up solids content in sludge prior to feed to centrifuge.</li> <li>- Centrifuge has speed control and discharge weir control to retain and build up solids content and control dryness of sludge.</li> <li>- Sludge to be characterised at the initial period of commissioning prior to being sent off site for disposal. Characterisation to be in line with EPA IWRG 631</li> <li>- Sludge to be characterised when lime is added to the sludge system. Characterisation to be in line with EPA IWRG 631</li> <li>- Skips of sludge will be removed regularly (once filled) and disposed off site in accordance with EPA guidelines.</li> <li>- Sludge from the centrifuge is expected to be classified as non-hazardous.</li> <li>- Management of wastes by design (screenings and sludge) as per Plant Wide Process (DP2-0001).</li> <li>- Sludge collected from site regularly (using covered skips/trucks) to ensure there is no build up of waste onsite and associated potential odour issues. Anticipated as approximately 8T/Day for one stream during average operation.</li> </ul> <p>Commissioning will be implemented as per the following Commissioning Work Packs:</p> <ul style="list-style-type: none"> <li>- Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).</li> <li>- Commissioning Phase Sludge Sampling and Classification procedure (PR-TDV-EN-2-N-000-0001).</li> </ul> | VG            | E           | 2           | E2                             | Low |

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| 16     | Commissioning of the Sludge System. | Air quality - odour and emissions.  | Emission of odour caused by composing organic materials in sludge.  | Impact on neighbourhood amenity.   | C           | 3           | C3 High                         | Control measures include , but are not limited to:<br>- The sludge are contained in covered skips and located within the sludge building to minimise fugitive emissions.<br>- Skips of sludge will be removed regularly (once filled) and disposed off site to avoid stockpiling of waste.<br>- High throughput (on average 1 skip per day initially to ~8 skips per day at full capacity)<br><br>Commissioning will be implemented as per the following Commissioning Work Packs:<br>- Odour assessment will be implemented as per the Commissioning Procedure for Odour Assessment (COMM-052)  | VG            | E           | 2           | E2 Low                         |
| 17     | Disposal of sludge waste.           | Waste General.<br><br>Minimise waste through the adoption of best practice waste reduction and disposal procedures consistent with the EPA waste hierarchy.<br><br>Manage, store, handle in accordance with EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Inappropriate offsite management of waste including:<br>* Inappropriate handling, loading and transport of backwash sludge not in accordance with the EPA Waste Management Policies.<br>* Unforeseen contamination due to inappropriate or illegal disposal of waste. | * Contamination of environment by waste.<br>* Impact to land or water at location of disposal. | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>- Management of wastes by design (screenings and sludge) as per Plant Wide Process (DP2-0001 ).-<br>- Classification of similar sludge from Perth Plant indicates that the sludge is not expected to be hazardous and certainly not combustible nor flammable<br>- Characterisation of waste prior to off site disposal, as per EPA IWRG 631 and IWRG701<br>- Separate characterisation of waste during commissioning to reflect anticipated sludge characteristics<br>- Skips of sludge will be removed regularly (once filled) and disposed of off site.<br>- All waste disposal to occur in accordance with EPA guidelines.<br>- Disposal methodology (trucks) to be set in place contractually (note: inclusive of evacuation from sludge & dewatering screw skip).<br>- Ensure sufficient resources are available for waste pickup during commissioning. NB. Overall sludge production would be lower due start/stop and low flow operating conditions.<br>- Use of a EPA Licensed transporter and landfill for the disposal of all Industrial Waste<br>- Copies of EPA waste transport certificates to be retained and filed for the transport of Industrial Waste.<br>- Make use of covered skips, covered transport, waste transport certificates and receipts, as per D&C EMP Commissioning Sub Plan At I2.5 Plan Commissioning, control measures table.<br>- Trucks to use major roads where possible (not backstreets) and stick to a defined route.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00)   | VG            | E           | 2           | E2 Low                         |
| 18     | Commissioning of the DMPF system.   | Marine Flora and Fauna - Outlet.  | Discharge of filtered water from DMPF to Marine outlet and associated potential release of overdosed chemicals into the marine environment.   | Toxic effect upon Marine Flora and Fauna causing death, injury or reduction in health.         | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>- Dosing of chemicals into the feedwater stream is automatically controlled to the required pH (~6.8).<br>- The pH and chemical flow control has warnings that triggers a automatic system response, and alarms which trigger an operator response and corrective action procedures.<br>- An event of Low pH will result in the system stoping dosing of chemicals. Chemical dosing will be automated and monitored in real time to ensure no over dosing.<br>- Additional monitoring at the outfall records water quality parameters and provides warnings and Level 1 triggers. Alarms will alert the operator of abnormal operation and initiate investigation of potential cause of excursion and implement appropriate action to bring conditions back to normal.<br>- Monitoring of water quality at the outfall of the Seawater lift pump station and alarm triggers from these monitoring instruments will initiate appropriate actions, e.g. check subsystem that is causing deviation and correct, check instrument calibration, check control function etc.<br>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of malfunction.<br>- Water quality will be confirmed through inline water quality monitoring with dual redundancy (primary and secondary instruments) including real time alarms.<br>- Return flows will be a combination of filtered water that has cleaner attributes to sea water.<br>- Spills will be managed in accordance with the D&C PGA Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control | VG            | E           | 2           | E2 Low                         |





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| 19     | Commissioning of the DMPF system  | Marine environment (beneficial uses).                             | Failure of inline monitoring system resulting in potential discharge of off specification water to the marine environment. | Loss of individuals or biodiversity.  | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>Design:<br>- Primary and secondary measurement instruments installed, smart instrument to provide status of instrument.<br>- Construction of equipment in accordance with Australian and International Standards.<br>Commissioning:<br>- Calibration and testing of chemical system performed with water during pre-commissioning process to minimise risk of malfunction.<br>- Manual grab samples for analysis on regular basis.<br>- Design includes a redundancy monitoring system and one monitoring system will be online at all times. Redundancy monitoring exists at critical control points, such as the sea water lift pump outlet and backwash effluent channel.<br>- Manual sampling will be conducted from the outfall and laboratory analysis will be conducted.<br>- Progressive plant shutdown in the event of monitoring failure (primary and secondary). | VG            | D           | 2           | D2 Low                         |
| 20     | Commissioning of the DMPF system. | Surface water quality.  | Leaks from piping and equipment during commissioning process.  | Leakage of seawater or filtered seawater onto the surrounding ground on site contaminating surface water. | C           | 2           | C2 Moderate                     | Control measures include, but are not limited to :<br>Design :<br>- Equipment and piping are designed to a rating higher than the operating requirements.<br>Commissioning:<br>- Hydrostatic test of equipment and piping with fresh water during pre-commissioning prior to process commissioning of the filters. Leaks will be rectified during pre-commissioning.<br>- Pressure monitoring for loss of pressure due to major failure.<br>- Visual inspection of equipment as part of commissioning to detect any minor leaks.<br>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&C PGA and Utilities EIRPs as appropriate.  | VG            | D           | 2           | D2 Low                         |



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|--------|--|--|--|--|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
| 21     | Potential injection of dilute sodium hypochlorite for biofilm control of SWLP, DMPF, Cartridge filter systems prior to feed to RO. | Marine Flora and Fauna - Inlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach.   | Discharge of off specification water to marine environment due to:<br>- Overdosing of sodium hypochlorite at intake.<br>- lack of neutralisation of sodium hypochlorite. | Impact on marine environment (beneficial uses) outside mixing zone resulting in loss of individuals or biodiversity. | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>Design:<br>- Interlock sodium hypochlorite inject with operation of seawater lift pumps (SWLPS) and therefore stops dosing when SWLPS are stopped.<br>- Sodium hypochlorite injection nozzles are within the intake structure.<br>- Sodium hypochlorite injection only occurs when seawater lift pumps are operating.<br>Commissioning:<br>- Automatic control of sodium hypochlorite dosing during the entire biofilm control process.<br>- Primary control - is continuous monitoring and control of sodium hypochlorite in the seawater during the entire biofilm control process as well as dosing of sodium bisulphite (SBS) into the discharge of DMPF Backwash tank and Cartridge filter outlet to neutralise the sodium hypochlorite.<br>- As a secondary measure - continuous monitoring and dosing of SBS into outfall during the entire biofilm control process.<br><br>- Interlock to stop dosing of sodium hypochlorite should the SBS dosing system fails.<br>- Additional personnel will be assigned to monitor chlorine level at the critical locations, such as seawater launder, DMPF feed, Cartridge filter discharge and outfall during the biofilm control process.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00) and specific Standard Operating Procedures (being developed).   | VG            | E           | 2           | E2 Low                         |
| 22     | Biofilm control of systems prior to feed to RO.  | Marine Flora and Fauna - General.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Discharge of off specification water to marine environment due to:<br>- Overdosing of sodium hypochlorite at intake.<br>- lack of neutralisation of sodium hypochlorite. | Impact on marine environment (beneficial uses) outside mixing zone resulting in loss of individuals or biodiversity. | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>Design:<br>- Sodium hypochlorite will be neutralised with sodium bisulphide as it exits the process. This could be at DMPF Backwash Tank discharge channel, or at the Cartridge Filters depending on process requirements.<br>- Any un-neutralised sodium hypochlorite will be neutralised with sodium bisulphide at the outfall chamber of the seawater lift pump station.<br>- Interlock sodium hypochlorite inject with operation of seawater lift pumps and therefore stops dosing when SWLPS are stopped.<br>Commissioning:<br>- Automatic control of sodium hypochlorite quantity during the entire biofilm control process.<br>- Continuous monitoring of sodium hypochlorite in the seawater during the entire biofilm control process.<br>- Continuous monitoring of sodium bisulphite (SBS) dosage at the outfall and automatic interlock to stop dosing of sodium hypochlorite should the SBS dosing system fail.<br>- Follow appropriate procedures for the biofilm control process.<br>- The Marine monitoring programs that will be conducted during Commissioning are set out in the 30A Commissioning Approval Application and Commissioning MIRA Schedule (Attachment I.4). The 30A Commissioning Approval Application is informed by the Baseline Marine Monitoring Program.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00) and specific Standard Operating Procedures (being developed). | VG            | E           | 2           | E2 Low                         |

**Reverse Osmosis and potabilisation Commissioning**



| Risk # | Commissioning Activity   | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)  | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|--|---|---|--|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
| 23     | Commissioning of RO Chemicals and potabilisation chemical systems, including sodium hypochlorite, sodium bisulphite, antiscalant, carbon dioxide, FSA, Lime. | Minimise Use of hazardous chemicals.<br>Minimise adverse affects of chemicals on the receiving environment. | Potential for unwanted chemicals spills/leaks due to malfunction of components during commissioning.  | Soil and water contamination:<br>* Localised contamination of soils or groundwater/surface water systems.<br>* Subsequent downstream groundwater/surface water systems.<br>* Follow on effects on flora and fauna. | B           | 2           | B2 High                         | Control measures include, but are not limited to:<br>Design:<br>Focused on maximising safety, safe operation and minimising potential to cause environmental impact as follows.<br>- All concentrated chemicals are housed within designated bunded areas.<br>- All truck unloading areas are designed to capture any spills from truck unloading operations.<br>- Chemical pipe works outside buildings are in culverts or double contained if direct buried.<br>- All concentrated chemicals are housed within designated bunded area.<br>Commissioning:<br>- Pipes will be hydrostatically tested to ensure installation is integral prior to introduction of chemicals.<br>- Chemical systems are tested with water first to ensure correct interlock, control and functionality.<br>- Handling of chemicals, including spill cleanup, to occur in accordance with MSDS as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br>- Staff trained in the appropriate management of Hazardous materials and response to spills in accordance with the D&C PGA and Utilities EIRPs as appropriate.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006)  | VG            | D           | 2           | D2 Low                         |
| 24     | Commissioning of RO Chemicals and potabilisation chemical systems, including sodium hypochlorite, sodium bisulphite, antiscalant, carbon dioxide, FSA, Lime. | Minimise Use of hazardous chemicals.<br>Minimise adverse affects of chemicals on the receiving environment. | Incorrect chemical dosage due to malfunction of equipment / Discharge to Marine outlet and associated potential release of overdosed chemicals into the marine environment. | Toxic effect upon Marine Flora and Fauna causing death, injury or reduction in health.   | C           | 2           | C2 Moderate                     | Control measures include, but are not limited to:<br>Design: Focused on maximising safety and minimising potential to cause environmental impact as follows.<br>- Closed loop control of dosing equipment.<br>- Automatic shut down of pump if instrument or control failure occurs.<br>Commissioning:<br>- Calibration of instruments at intervals required by manufacturer.<br>- Control sequence is tested with water prior to introduction of chemicals.<br>- Chemical systems are tested with water first to ensure correct interlock, control and functionality.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006)   | VG            | D           | 2           | D2 Low                         |
| 25     | Commissioning of RO Chemicals and potabilisation chemical systems, including sodium hypochlorite, sodium bisulphite, antiscalant, carbon dioxide, FSA, Lime. | Use of chemicals.<br>Minimise adverse affects of chemicals on the receiving environment.                    | Chemicals spills during truck unloading.  | Soil and water contamination:<br>* Localised contamination of soils or groundwater/surface water systems.<br>* Subsequent downstream groundwater/surface water systems.<br>* Follow on effects on flora and fauna. | C           | 3           | C3 High                         | Control of hazards by a combination of design and procedural measures:<br>- Unloading of bulk chemicals will be within designated bunded areas and follow Operating Procedures. Refer to preliminary list of operating procedures in TDV-2-EV-PRD-0006 - Commissioning Environmental Monitoring & Control Procedure.<br>- Any spill within the truck unloading areas will be contained, investigated and disposed in accordance with appropriate operating procedures.<br>- Chemical storage tanks are located in a designated bunded areas. These areas will be bunded to EPA bunding guidelines (bund volume capacity will be equal to the capacity of the largest tank + 10% of another tank within the same bund).<br>- Any spills or leaks from within the bund will be contained or treated prior to discharge or disposal with an accredited waste disposal company.<br><br>Additional control measures include, but are not limited to:<br>Design:<br>- Storage of chemicals as per Plant Wide Process Design (DP2-0001).<br>- Each chemical is stored in a bunded area as appropriate. Any spills or leaks from within the bund will be captured, assessed and disposed of in accordance with Operating Procedures.<br>- Tanks have level transmitter and high level switches to interlock feed system and prevent overfilling.<br>Commissioning:<br>- Hydrostatic test of piping prior to introduction of chemicals.<br>- Transport, storage and handling of chemicals for commissioning will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of leaks | VG            | E           | 2           | E2 Low                         |



| Risk # | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)  | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|---|---|---|--|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
|        |   |   |   |  |             |             |                                 | <p>process to minimise risk of leaks.</p> <ul style="list-style-type: none"> <li>- Tested sequence to ensure that the likelihood of chemical spillage from malfunction of instrument is minimised.</li> <li>- Commissioning activities will comply with the legislation relevant to Occupational Health and Safety and Australian Dangerous Goods Code in relation to any hazardous materials used onsite.</li> <li>- Staff trained in the appropriate management of Hazardous materials and response to spills in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring &amp; Control Procedure (TDV-2-EV-PRD-0006).</p>   |               |             |             |                                |
| 26     | Use of RO Chemicals and potabilisation chemical systems, including sodium hypochlorite, sodium bisulphite, antiscalant, carbon dioxide, FSA, Lime | Use of chemicals.<br><br>Minimise adverse affects of chemicals on the receiving environment.  | Malfunction of equipment leading to over dosing of chemicals and potential for unwanted discharge of process refuse with higher chemical content into the marine environment. | Potential to cause adverse affects on marine flora and fauna.  | C           | 3           | C3 High                         | <p>Control measures include, but are not limited to:</p> <p>Design:</p> <ul style="list-style-type: none"> <li>- Dosing of chemical is under closed-loop control which reduces chemical use when set point is approached and stops chemical dose when control set point is breached.</li> </ul> <p>Commissioning:</p> <ul style="list-style-type: none"> <li>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of malfunction.</li> <li>- Tested sequence to ensure that the likelihood of chemical dosing control system malfunction is minimised.</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring &amp; Control Procedure (TDV-2-EV-PRD-0006).</p>   | VG            | D           | 2           | D2 Low                         |
| 27     | Flushing of RO piping from Cartridge Filter to RO 1st & 2nd Pass (Disposal of water to Outfall from RO Pipe Flushing).                            | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Construction debris remaining in the RO Pipe will potentially be flushed to the Outfall during this commissioning activity.   | Discolouration of the water in the marine environment and subsequent potential impacts on beneficial uses outside mixing zone. | C           | 2           | C2 Moderate                     | <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Pipes will be cleaned, to remove any construction debris, and hydrostatically tested. Contaminants will be small particulates e.g. dust.</li> <li>- Flushing water will be directed to sumps within the RO building where the contaminants can settle.</li> <li>- The flushing water will then directed to the DMPF Backwash Effluent where the solids can be transferred to the sludge system for removal.</li> <li>- No chemicals will be used during this stage of commissioning.</li> <li>- Piping &amp; valving configuration prevents discharge to outfall at this process</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring &amp; Control Procedure (TDV-2-EV-PRD-0006).</p> | VG            | D           | 2           | D2 Low                         |



| Risk # | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect  | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |     |
|--------|---|--|---|--|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|-----|
| 28     | Flushing of RO piping from Cartridge Filter to RO 1st & 2nd Pass (Disposal of water to Outfall from RO Building Pipe Flushing). | Surface Water Quality. Minimise impacts on surface water quality.<br><br>Comply with State Environment Protection Policy (Waters of Victoria).<br><br>Achieve the Urban Stormwater Best Practice Environmental Management Guidelines performance objectives during construction and operation.<br><br>Comply with EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996). | Overflowing of pits in RO building.   | Contamination of onsite environment and potential contamination of surface water runoff. | C           | 2           | C2                              | Moderate<br><br>Control measures include, but are not limited to:<br>- Duty/assist pumps in the RO building pits to transfer water in the sumps to Backwash Effluent tank.<br>- Continuous monitoring and adjustment of flushing and draining valves to keep level control.<br>- Segregation of process drainage pit from stormwater system by design and construction<br>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&C PGA and Utilities EIRPs as appropriate.<br>- Stormwater discharge management system incorporates onsite treatment ponds and an ecological wetland.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring & Control Procedure (TDV-2-EV-PRD-0006).   | VG            | D           | 2           | D2                             | Low |
| 29     | Commissioning of first pass RO filters, without retention of permeate.  | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach.  | Low discharge flow of mixed permeate and brine to Outfall during RO start up commissioning. | Potential adverse affect to marine flora and fauna colonies.                             | C           | 2           | C2                              | Moderate<br><br>Control measures include, but are not limited to:<br>- Operate additional seawater lift pumps and bypass flow to achieve minimum flow in the outlet tunnel for good dilution.<br>- Discharge of mixed permeate and brine to result in water that is close to seawater in salinity.<br>- The pH from the brine and permeate streams will be that of feedwater from DMPF, e.g. approx pH 6.8.<br>- The antiscalant dose will be flow based and is controlled by flow control loop.<br>- When first pass brine and 1st pass permeate are discharged to the DMPF Backwash Tank, the mixed liquid will have near neutral pH.<br>- Continuous automated control of chemical dosage and real time monitoring to ensure no over dosing.<br>- Water quality will be monitored at the Outfall through inline water quality monitoring including instrument redundancy and real time alarms.<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring & Control Procedure (TDV-2-EV-PRD-0006). | A             | E           | 2           | E2                             | Low |
| 30     | Commissioning of 1st & 2nd pass RO system without retention of permeate.  | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach.  | Potential of overdosing caustic soda to 2nd pass feed which discharges to Outfall.          | Potential adverse affect to marine flora and fauna colonies.                             | C           | 3           | C3                              | High<br><br>Control measures include, but are not limited to:<br>- The caustic dose will be recipe based and depends on flow rate, dissolved heavy metal concentration in the seawater and seawater temperature. The pH of the 2nd pass feed is continuously monitored and automatically controls the caustic soda dosing.<br>- Multiple pH probes are used for monitoring and control of the pH.<br>- When first pass brine and 2nd pass permeate is discharged to the DMPF Backwash Tank, the mixed liquid will have near neutral pH.<br>- Continuous automated control of chemicals dosage and real time monitoring to ensure no over dosing.<br>- Multiple instruments used where critical.<br>- Water quality will be monitored at the outfall through inline water quality monitoring including redundancy instruments and real time alarms.<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring & Control Procedure (TDV-2-EV-PRD-0006).  | VG            | D           | 2           | D2                             | Low |



| Risk # | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)   | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |          |
|--------|---|---|---|---|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|----------|
| 31     | RO commissioning and Potabilisation Process Commissioning, without retention of permeate. | Marine Flora and Fauna - Outlet.<br>Comply with the State Environment Protection Policy (Waters of Victoria).<br>No observable accumulation of solid matter or staining on the beach. | Potential discharge of potabilised RO water with <1mg/L of sodium hypochlorite.   | Potential adverse affect to marine flora and fauna colonies.                        | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>Design:<br>- Potabilised water and brine will be mixed back together, resulting in a discharge flow to the Outlet similar to seawater (TDS similar and lower turbidity and Suspended Solids).<br>- Potabilisation chemicals are injected into the RO permeate under closed loop automatic control of pH, conductivity, fluoride level and sodium hypochlorite.<br>- Sodium bisulphite will be automatically dosed into the potabilised water being discharge to the outfall during the commissioning phase up until the Performance Test of each RO Bank. This is required to neutralise any sodium hypochlorite.<br>Commissioning:<br>- SBS will be dosed at the potabilisation system discharge to neutralise the sodium hypochlorite<br>- Water quality will be confirmed through inline monitoring at the outfall. SBS can be dosed at the outfall as well if ORP reading is high<br>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of leaks.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring & Control Procedure (TDV-2-EV-PRD-0006). | VG            | E           | 2           | E2                             | Low      |
| 32     | RO commissioning and Potabilisation Process Commissioning, without retention of permeate. | Marine Flora and Fauna - Outlet.<br>Comply with the State Environment Protection Policy (Waters of Victoria).<br>No observable accumulation of solid matter or staining on the beach. | Failure of inline monitoring system, resulting in potential discharge of off specification water to marine environment. | Marine environment:<br>- Beneficial uses.<br>- Loss of individuals or biodiversity. | B           | 3           | B3 High                         | Control measures include, but are not limited to:<br>Design:<br>- Potabilisation chemicals are injected into the RO permeate under closed loop automatic control of pH, conductivity, fluoride level and sodium hypochlorite.<br>- Primary and secondary instruments are used for control and monitoring.<br>- Mixing of potabilised water and brine from RO results in discharge water very close to seawater quality.<br>Commissioning:<br>- Sodium bisulphite will be dosed into the potabilised water being discharge to the outfall during the commissioning phase up until the Performance Test of each RO Bank. This is required to neutralise any hypochlorite.<br>- Calibration and testing of chemical delivery system performed with water during the pre-commissioning process to minimise the risk of leaks.<br>- Regular visual inspection of the Marine Environment will be undertaken to detect changes to the marine environment. If necessary, shutdown procedures will be implemented.  | VG            | D           | 3           | D3                             | Moderate |

**Overall Systems Commissioning**



| Risk # | Commissioning Activity   | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity                                   | Potential Impact (Receptor)   | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)  | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|--|---|--|---|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
| 33     | Discharge to Outfall During Reliability Test - retention of permeate and discharge of brine. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Discharge of brine to Outfall.   | Release of brine into environment and potentially could adversely affect marine flora and fauna colonies. | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>- Effective design of outlet diffuser structures to disperse the brine.<br>- Testing of salinity in the vicinity of the outlet diffusers to validate engineering design model.<br>- Water will be discharged in accordance with Works Approval Report 2.2 and 2.3.<br>- Discharge will occur in accordance with EPA 30A Commissioning approval requirements.<br>- Brine discharge is dispersed at the outlet structure to achieve adequate dilution at the edge of the mixing zone (<1psu rise above ambient).<br>- Water quality will be confirmed through inline water quality monitoring including primary and secondary instruments, real time monitoring and alarms. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Chemical dosing will be automated and monitored in real time to ensure no over dosing.<br>- By automatic closed loop control of chemical dosing to achieve control target as described in the previous commissioning steps above.<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br>- Regular manual sampling and monitoring of the outfall discharges<br>- Diffuser validation with 1 stream operation (worst case discharge) to confirm validate hydrodynamic modelling<br>- The Marine monitoring programs that will be conducted during Commissioning are set out in the Operational Marine Monitoring Program (OMMP) (Attachment I.5) and Commissioning MIRA Schedule (Attachment I.4). Attachment I.5 is informed by the Baseline Marine Monitoring Program and the Operational Marine Monitoring Program.<br>- Spills will be managed in accordance with the D&C PGA Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>Commissioning will be implemented as per the following Commissioning Work Packs:<br>- Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Tracer Testing (Diffuser Validation) and Direct Toxicity Assessment (COMM 053) | VG            | E           | 3           | E3 Moderate                    |
| 34     | Discharge to Outfall During Reliability Test - retention of permeate and discharge of brine. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Low flows during initial commissioning leading to insufficient dispersion. | Marine environment (beneficial uses) outside of mixing zone.  | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>- Diffuser designed to perform with minimum equivalent flow<br>- Bypass capabilities at sea water lift pump station to increase flow rate, operate additional seawater lift pumps to increase flow and assist dispersion.<br>- Water will be discharged in accordance with Works Approval Report 2.2 and 2.3.<br>- Discharge will occur in accordance with EPA 30A Commissioning approval requirements.<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br>- The Marine monitoring programs that will be conducted during Commissioning are set out in the Operational Marine Monitoring Program (OMMP) (Attachment I.5) and Commissioning MIRA Schedule (Attachment I.4). Attachment I.5 is informed by the Baseline Marine Monitoring Program and the Operational Marine Monitoring Program.  | VG            | D           | 2           | D2 Low                         |



| Risk # | Commissioning Activity               | Relevant Performance Criteria / Performance Requirements / Aspect  | Potential Hazard resulting from activity  | Potential Impact (Receptor)   | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option) | Effectiveness  | Probability | Consequence | Residual Risk (After Controls) |    |          |
|--------|--------------------------------------|--|---|---|-------------|-------------|---------------------------------|--|--|-------------|-------------|--------------------------------|----|----------|
| 35     | Commissioning of Stabilisation Pond. | <p>Surface Water Quality. Minimise impacts on surface water quality. Comply with State Environment Protection Policy (Waters of Victoria).</p> <p>Achieve the Urban Stormwater Best Practice Environmental Management Guidelines performance objectives during construction and operation.</p> <p>Comply with EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996).</p> <p>Stormwater treatment system is to be fully integrated into the overall detail design of the Desalinated Water Supply System and its power supply and include spill management infrastructure to protect surface water quality.</p> | Overflow of stabilisation ponds during filling.                                 | Overflow from stabilisation pond entering the stormwater drainage and impacting on downstream biological communities. | D           | 3           | D3                              | Moderate   | <p>Control measures are in place to prevent overflow as follows:</p> <ul style="list-style-type: none"> <li>- Separate level monitoring instruments and level switches that interlock with inlet valves and pumps.</li> <li>- Ample freeboard of stabilisation pond design on top of the maximum volume of discharge from the process.</li> </ul> <p>Additional control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Calibration and testing of instruments.</li> <li>- Operator monitoring during discharge to stabilisation pond.</li> <li>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).</p>   | VG          | E           | 2                              | E2 | Low      |
| 36     | Commissioning of Stabilisation Pond. | <p>Marine Flora and Fauna - Outlet.</p> <p>Comply with the State Environment Protection Policy (Waters of Victoria).</p> <p>No observable accumulation of solid matter or staining on the beach.</p>   | Discharge of un-neutralised or insufficiently neutralised chemicals to outfall. | Marine environment (beneficial uses).   | C           | 4           | C4                              | Extreme  | <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Automatic interlock to prevent discharge from Stabilisation Ponds to Outfall if pH is outside permissible range.</li> <li>- Plant design and control sequence allows the water to be tested, circulated, adjusted and managed prior to discharge.</li> <li>- Run additional seawater lift pumps to ensure sufficient mixing of the liquid prior to discharge.</li> <li>- Calibration and testing of chemical delivery system performed with water during pre-commissioning process to minimise risk of leaks.</li> <li>- Water quality will be confirmed through inline water quality monitoring including instrument redundancy and real time alarms. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).</li> <li>- Chemical dosing will be automated and monitored in real time to ensure no over dosing.</li> <li>- Plant design allows water to be tested, circulated, adjusted and managed prior to discharge to ensure discharge quality specification is achieved.</li> <li>- Spills to be managed in accordance with the D&amp;C PGA Hazardous Materials Sub Plan (Attachment I2 D&amp;C PGA EMP).</li> <li>- Staff trained in the appropriate management of Hazardous materials and response to spills in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).</p> | VG          | D           | 3                              | D3 | Moderate |



| Risk # | Commissioning Activity   | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity     | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |     |
|--------|--|---|--|--|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|-----|
| 37     | Commissioning of the VDP - multiple streams & retention of permeate. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Discharge of brine to Outfall.               | Release of brine into environment and could adversely affect marine flora and fauna. | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>Design :<br>- Higher brine flow rate results in more efficient and better dispersion of the brine at the outlet structure.<br>- By automatic closed loop control of chemical dosing to achieve control target as described in the previous commissioning steps above.<br>Commissioning:<br>- Discharge will occur in accordance with EPA 30A Commissioning approval requirements.<br>- Calibration and testing of the chemical delivery system will be performed with water during the pre-commissioning process to minimise the risk of leaks.<br>- Brine discharge is dispersed at the outlet structure to achieve adequate dilution at the edge of the mixing zone (<1psu rise above ambient).<br>- Water quality will be confirmed through inline water quality monitoring including primary and secondary instruments, real time monitoring and alarms. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Chemical dosing will be automated and monitored in real time to ensure no over dosing.<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br>- The Marine monitoring programs that will be conducted during Commissioning are set out in the Operational Marine Monitoring Program (OMMP) (Attachment I.5) and Commissioning MIRA Schedule (Attachment I.4). Attachment I.5 is informed by the Baseline Marine Monitoring Program and the Operational Marine Monitoring Program.<br>- Spills will be managed in accordance with the D&C PGA Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br>Commissioning will be implemented as per the following Commissioning Work Packs:<br>- Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Tracer Testing (Diffuser Validation) and Direct Toxicity Assessment (COMM 053) | VG            | D           | 2           | D2                             | Low |
| 38     | Commissioning of the VDP - multiple streams.                         | Airborne noise.<br><br>Minimise impacts from airborne noise.  | Noise generated by VDP commissioning.        | Impact on neighbourhood amenities and receptors.                                     | D           | 3           | D3 Moderate                     | Mitigation and Control measures are as follows:<br>Design:<br>- The equipment which emit noise during operation are encapsulated in buildings or appropriate enclosures.<br>- Building ventilation systems incorporate noise attenuators to reduce noise emissions to the environment.<br>- The Desalination Plant is designed to EPA SEPP N1 and S3/89.<br><br>Commissioning will be implemented as per following Commissioning Work Packs:<br>- Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Noise assessment will be performed to confirm design model as per the Environmental Noise Assessment (COMM-051).   | VG            | E           | 2           | E2                             | Low |
| 39     | Commissioning of the VDP - multiple streams.                         | Air quality - odour and emission.<br><br>Limit odour and emissions from Desalination Plant operations.  | Odour generated by VDP during commissioning. | Impact on neighbourhood amenities and receptors.                                     | D           | 3           | D3 Moderate                     | Control measures include , but are not limited to:<br>- The sludge is contained in covered skips and located within the sludge building.<br>- Skips of sludge will be removed regularly (once filled) and disposed off site to avoid stockpiling of waste.<br>- The Odour assessment will be implemented as per the Commissioning Procedure for Odour Assessment (COMM 052).   | VG            | E           | 2           | E2                             | Low |



| Risk # | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect  | Potential Hazard resulting from activity                       | Potential Impact (Receptor)   | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option) | Effectiveness  | Probability | Consequence | Residual Risk (After Controls) |    |     |
|--------|-------------------------|--|--|---|-------------|-------------|---------------------------------|--|--|-------------|-------------|--------------------------------|----|-----|
| 40     | Pipeline Commissioning. | <p>Waterways and Wetlands.</p> <p>Comply with the State Environment Protection Policy (Waters of Victoria).</p> <p>No significant impact on Western Port Ramsar Site.</p> <p>Maintain the environmental values of waterways and wetlands.</p> <p>Compliance with all relevant Government Agency and/or Water Authority requirements for waterways and wetlands.</p> <p>Avoid where practicable or minimise impacts in the designated areas presented in Figures:</p> <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant Area</li> <li>• PR Sensitivity Areas – Transfer Pipeline - Sheet 1, 2, 4, 5 and 6</li> <li>• PR Sensitivity Areas – Northerly Grid Connection. in the Property Schedule.</li> </ul> | Discharge of chlorinated or turbid water.                      | Impact to Cardinia Reservoir quality and aquatic flora/fauna habitat.   | C           | 3           | C3                              | High   | <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Water quality will be confirmed through onsite monitoring and vented in accordance with the Transfer Pipeline Hydrostatic Test and Commissioning Phase Environmental Discharge Procedure (PLV-3-EN-PR-0003-00) if water does not meet Melbourne Water Requirements for water entering Cardinia Reservoir.</li> <li>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Transfer Pipeline Hydrostatic Test and Commissioning Phase Environmental Discharge Procedure (PLV-3-EN-PR-0003-00).</p>  | VG          | D           | 2                              | D2 | Low |
| 41     | Pipeline Commissioning. | <p>Waterways and Wetlands.</p> <p>Comply with the State Environment Protection Policy (Waters of Victoria).</p> <p>No significant impact on Western Port Ramsar Site.</p> <p>Maintain the environmental values of waterways and wetlands.</p> <p>Compliance with all relevant Government Agency and/or Water Authority requirements for waterways and wetlands.</p> <p>Avoid where practicable or minimise impacts in the designated areas presented in Figures:</p> <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant</li> </ul>  | Leakage from pipeline fittings causing uncontrolled discharge. | Reduction in beneficial values of waterway and adverse impacts to aquatic flora and fauna due to chlorinated or turbid water. | C           | 3           | C3                              | High   | <p>Control measures include:</p> <ul style="list-style-type: none"> <li>- Pneumatic pressure test scour valves prior to filling to verify seal.</li> <li>- Minimise and control discharge in accordance with the Hydrotest Contingency Plan (PLV-3-MA-PR-0001-01) including shut down feed pumps of fill valves to cease further filling of pipe until leak is controlled and closure of isolation valves.</li> <li>- Implement contingency response procedure from Hydrotest and commissioning discharge procedure (PLV-3-EN-PR-0003-00) to manage impacts to water quality as required.</li> <li>- Water quality will be confirmed through monitoring and drained in accordance with the Hydrotest and commissioning discharge procedure (PLV-3-EN-PR-0003-00) .</li> <li>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&amp;C PGA and Utilities EIRPs as appropriate.</li> </ul> <p>Commissioning will be implemented as per the Transfer Pipeline Hydrostatic Test and Commissioning Phase Environmental Discharge Procedure (PLV-3-EN-PR-0003-00).</p> | VG          | D           | 2                              | D2 | Low |



| Risk # | Commissioning Activity  | Relevant Performance Criteria / Performance Requirements / Aspect  | Potential Hazard resulting from activity   | Potential Impact (Receptor)   | Probability |             | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option) | Effectiveness   |             |             | Residual Risk (After Controls) |    |     |
|--------|-------------------------|--|--|---|-------------|-------------|---------------------------------|--|---|-------------|-------------|--------------------------------|----|-----|
|        |                         |  |  |   | Probability | Consequence |                                 |  | Effectiveness   | Probability | Consequence |                                |    |     |
|        |                         | <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant Area</li> <li>• PR Sensitivity Areas – Transfer Pipeline - Sheet 1, 2, 4, 5 and 6</li> <li>• PR Sensitivity Areas – Northerly Grid Connection. in the Property Schedule.</li> </ul>  |  |   |             |             |                                 |  |   |             |             |                                |    |     |
| 42     | Pipeline Commissioning. | <p>Waterways and Wetlands. Comply with the State Environment Protection Policy (Waters of Victoria). No significant impact on Western Port Ramsar Site.</p> <p>Maintain the environmental values of waterways and wetlands.</p> <p>Compliance with all relevant Government Agency and/or Water Authority requirements for waterways and wetlands.</p> <p>Avoid where practicable or minimise impacts in the designated areas presented in Figures:</p> <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant Area.</li> <li>• PR Sensitivity Areas – Transfer Pipeline - Sheet 1, 2, 4, 5 and 6.</li> <li>• PR Sensitivity Areas – Northerly Grid Connection. in the Property Schedule.</li> </ul> | Minor leakage/failure of pipeline infrastructure leading to minor uncontrolled discharge to waterways. | Impact to surrounding waterway and wetland quality and aquatic flora and fauna habitat. | C           | 2           | C2                              | Moderate   | Control measures include, but are not limited to:<br>- Slow filling and progressive filling of pipeline.<br>- Pneumatic pressure test scour valves prior to filling to verify seal.<br>- Minimise and control discharge in accordance with the Hydrotest Contingency Plan (PLV-3-MA-PR-0001-01) including shut down feed pumps of fill valves to cease further filling of pipe until leak is controlled and closure of isolation valves.<br>- Implement contingency response procedure from Transfer Pipeline Hydrostatic Test and Commissioning Phase Environmental Discharge Procedure (PLV-3-EN-PR-0003-00) to manage impacts to water quality as required.<br>- Staff trained in the appropriate management of unplanned discharges and response in accordance with the D&C PGA and Utilities EIRPs as appropriate.<br><br>Commissioning will be implemented as per the Transfer Pipeline Hydrostatic Test and Commissioning Phase Environmental Discharge Procedure (PLV-3-EN-PR-0003-00). | VG          | E           | 2                              | E2 | Low |



| Risk #  | Commissioning Activity   | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|---|--|---|---|--|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|
| 43  | RO membranes Clean in Place (during operation, after approx 6-12 months from commissioning).                                     | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach.   | Disposal of neutralised effluent from Cleaning In Place/flushing of membranes.  | Impact on the marine environment (beneficial uses) outside mixing zone.                      | C           | 3           | C3 High                         | Control measures include, but are not limited to:<br>- CIP fluid will be neutralised within piping loop or sent to stabilisation pond for treatment prior to disposal to Outfall.<br>- The chemicals can be sent to stabilisation ponds for further treatment or neutralisation.<br>- Water quality will be confirmed through inline water quality monitoring including instrument redundancy and real time alarms. Chemical dosing will be automated and monitored in real time to ensure no over dosing. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- Regular monitoring data reports will be generated and reviewed to demonstrate compliance.<br>- The Marine monitoring programs that will be conducted during Commissioning are set out in the Operational Marine Monitoring Program (OMMP) (Attachment I.5) and Commissioning MIRA Schedule (Attachment I.4). Attachment I.5 is informed by the Baseline Marine Monitoring Program and the Operational Marine Monitoring Program.<br>- Spills will be managed in accordance with the D&C PGA Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00). | VG            | D           | 2           | D2 Low                         |
| 44  | Pipeline Commissioning - Discharge of pipeline water into outfall to remove dust contaminants etc and stagnant water in the pipe | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach.   | Potential for discharge of fresh water with high pH and dust contaminants to the Marine Outlet.                                 | Impact on the marine environment (beneficial uses) outside mixing zone.                      | D           | 3           | D3 Moderate                     | Control measures include , but are not limited to:<br>- The drainage flow rate of pipeline water is controlled, (max design flow is <800L/s) so there will be little scouring of the main pipeline.<br>- Operate additional seawater lift pumps to ensure dilution of the pipeline water with seawater to both reduce pH of the pipeline water to within discharge targets as well as to limit reduction to the salinity of the water at outfall.<br>- Monitoring of pH at the outfall chamber and adjustment of the drainage flow rate of the pipeline water.<br><br>Commissioning will be implemented as per the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).  | VG            | E           | 2           | E2 Low                         |
| <b>Potential Emergencies and Abnormal Events For All Commissioning Activities</b> |  |   |   |  |             |             |                                 |  |               |             |             |                                |
| 45  | Potential Emergencies and Abnormal Events.   | Air quality - Dust.<br><br>Limit dust emissions.<br><br>Compliance with the State Environmental Protection Policy (Air Quality Management) and EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996).<br><br>Minimise dust impacts on sensitive receiver sites. | Extreme hot dry conditions during a weekend or overnight break in commissioning causing excessive dust emanating from the site. | Potential for Dust disturbance and impacts on sensitive receptors including loss of amenity. | D           | 4           | D4 High                         | Control measures include:<br>- Automated PM10 dust monitoring in place with alarm trigger.<br><br>Refer to D&C PGA EMP Air Quality D&C PGA Sub-plan (Attachment I4 to the D&C PGA EMP) and CESP Attachment I.2 (Commissioning Management Strategies) for further details.  | VG            | E           | 3           | E3 Moderate                    |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect | Potential Hazard resulting from activity                              | Potential Impact (Receptor)                               | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option) | Effectiveness  | Probability | Consequence | Residual Risk (After Controls) |    |     |
|--------|--|---|---|---|-------------|-------------|---------------------------------|--|--|-------------|-------------|--------------------------------|----|-----|
| 46     | Potential Emergencies and Abnormal Events. | Air quality - due to fire.  | Fire event resulting from commissioning activities or natural events. | Potential for air quality impacts on sensitive receptors. | D           | 2           | D2                              | Low  | <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Fire protection system within buildings and areas of higher risk will be in operation, e.g. cable chambers.</li> <li>- Storage of flammable liquids/substances away from sources of extreme heat and or sparks as per the Hazardous Materials Sub Plan (Attachment I2 to the D&amp;C PGA EMP).</li> <li>- Heat-out rules in place for extreme weather.</li> <li>- Hand-held plant that may cause a spark are used according to site safety protocols and usage is restricted or forbidden on total fire ban days.</li> <li>- Appropriate signage restricting smoking on site. along with designated 'smoking' areas with approved disposal bins.</li> <li>- Regular updates on forecast storm conditions, to inform site supervisors of potential fire hazards, should a lightning storm ensure.</li> <li>- Supply of suitable fire extinguishing equipment and training of relevant staff in fire fighting techniques.</li> <li>- Landowners identified to be at risk of any fire will be notified as soon as practicable. D&amp;C PGA and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.</li> </ul> <p>Refer to D&amp;C PGA EMP Air Quality Sub Plan (Attachment I4 to the D&amp;C PGA EMP) and CESP Attachment I.2 (Commissioning Management Strategies) for further details.</p> | G           | E           | 2                              | E2 | Low |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect  | Potential Hazard resulting from activity             | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option) | Effectiveness  | Probability | Consequence | Residual Risk (After Controls) |    |          |
|--------|--|--|--|--|-------------|-------------|---------------------------------|--|--|-------------|-------------|--------------------------------|----|----------|
| 47     | Potential Emergencies and Abnormal Events. | <p>Terrestrial Flora and Fauna. Minimise impacts on terrestrial flora and fauna. Comply with the Victorian Native Vegetation Management Framework, including its net gain approach to vegetation clearance.</p> <p>Avoid where practicable or minimise impacts in the designated areas presented in Figures:</p> <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant Area.</li> <li>• PR Sensitivity Areas – Transfer Pipeline - Sheet 1, 2, 4, 5 and 6.</li> <li>• PR Sensitivity Areas – Northerly Grid Connection - Sheet 1, 2, 4, 5 and 7. in the Property Schedule.</li> </ul> <p>Apply EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) to limit impacts during construction.</p> | Movement of machinery and site vehicles.             | Fauna mortality resulting from collision with vehicles and machinery.  | B           | 3           | B3                              | High   | <p>Refer to D&amp;C PGA Flora and Fauna Sub Plan (Attachment I5)</p> <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Utilising public road network.</li> <li>- Minimising vehicle movements during the night time.</li> <li>- Minimising vehicle movement through areas with significant fauna habitat.</li> <li>- A reduced speed limit on access roads.</li> <li>- Fencing of site to prevent stock or other fauna from wandering into work site.</li> <li>- Education of work force through inductions and toolbox talks. D&amp;C PGA and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.</li> </ul>   | G           | C           | 2                              | C2 | Moderate |
| 48     | Potential Emergencies and Abnormal Events. | <p>Terrestrial Flora and Fauna. Minimise impacts on terrestrial flora and fauna. Comply with the Victorian Native Vegetation Management Framework, including its net gain approach to vegetation clearance.</p> <p>Avoid where practicable or minimise impacts in the designated areas presented in Figures:</p> <ul style="list-style-type: none"> <li>• PR Sensitivity Areas – Plant Area.</li> <li>• PR Sensitivity Areas – Transfer Pipeline - Sheet 1, 2, 4, 5 and 6.</li> <li>• PR Sensitivity Areas – Northerly Grid Connection - Sheet 1, 2, 4, 5 and 7. in the Property Schedule.</li> </ul> <p>Apply EPA Best Practice</p>   | Disease spread of known pathogen of flora and fauna. | Infection of fauna and flora resulting from transmission of the disease by vehicle, person, disposal of contaminated material etc. | B           | 4           | B4                              | Extreme  | <p>Refer to D&amp;C PGA Flora and Fauna Sub Plan (Attachment I5)</p> <p>Control measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Application of disinfectant to vehicle tyres and footwear.</li> <li>- Clearly signpost stockpiles, ensure spoil management records are sufficient to prepare monthly report, track spoil materials and provide staff with training.</li> </ul> <p>Should any infection occur, the following measures will be undertaken:</p> <ul style="list-style-type: none"> <li>- excavation of all contaminated soil.</li> <li>- Design stockpile areas for treatment and or disposal.</li> <li>- Cover infected stockpiles, install diversion banks, install sediment control structures, prevent human traffic through affected areas and clean equipment and machinery prior to leaving site.</li> <li>- Inspection of all vegetation prior to and during clearing (by a qualified ecologist).</li> <li>- EIRP to be followed in emergency situations and for all incidents (D&amp;C PGA EIRP for Plant Site Incidents and D&amp;C Utilities EIRP for Utilities corridor).</li> </ul> | VG          | D           | 3                              | D3 | Moderate |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity   | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)  | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|--|---|--|--|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
|        |  | Apply EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) to limit impacts during construction.   |  |  |             |             |                                 |   |               |             |             |                                |
| 49     | Potential Emergencies and Abnormal Events. | Hazardous Materials and dangerous goods.<br><br>Manage, store, handle and dispose any hazardous substances and dangerous goods in accordance with relevant policies, regulations and guidelines including the Victorian WorkCover Authority and Australian Standard AS1940 Storage and Handling of Flammable and Combustible Liquids, EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Hazardous substance spill resulting from equipment or plant failure (i.e. accidental rupture of tank etc). | Pollution of soils, receiving waters and potential harm/injury to personnel, flora and/or fauna. | D           | 4           | D4 High                         | Refer to above assessment for handling of chemicals.<br>Refer to relevant chemical Commissioning Work Package.<br>Transport, storage and handling of hazardous materials and dangerous goods will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>In addition to this, all relevant personnel are to be educated in the Environmental Incident Response Plan, Site Emergency Response Plan and the site's evacuation procedures. D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate. | G             | D           | 2           | D2 Low                         |
| 50     | Potential Emergencies and Abnormal Events. | Hazardous Materials and dangerous goods.<br><br>Manage, store, handle and dispose any hazardous substances and dangerous goods in accordance with relevant policies, regulations and guidelines including the Victorian WorkCover Authority and Australian Standard AS1940 Storage and Handling of Flammable and Combustible Liquids, EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Careless/negligent act leading to a spill/discharge of a hazardous substance.                              | Pollution of soils, receiving waters or potential harm/injury to personnel, flora and/or fauna.  | C           | 3           | C3 High                         | Refer to relevant chemical Commissioning Work Package.<br>Transport, storage and handling of hazardous materials and dangerous goods will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>In addition to this, all relevant personnel are to be educated in the Environmental Incident Response Plan, Site Emergency Response Plan and the site's evacuation procedures. D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.   | G             | D           | 3           | D3 Moderate                    |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)   | Potential Hazard |             | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |          |
|--------|--|---|---|---|------------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|----------|
|        |  |   |   |   | Probability      | Consequence |                                 |  |               |             |             |                                |          |
| 51     | Potential Emergencies and Abnormal Events. | Hazardous Materials and dangerous goods.<br><br>Manage, store, handle and dispose any hazardous substances and dangerous goods in accordance with relevant policies, regulations and guidelines including the Victorian WorkCover Authority and Australian Standard AS1940 Storage and Handling of Flammable and Combustible Liquids, EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Unexpected ignition of flammable and combustible liquids during normal commissioning operations.  | Pollution of soils, receiving waters or potential harm/injury to personnel, flora and/or fauna.                                     | E                | 4           | E4                              | High<br><br>Control measures include:<br>Design:<br>- Diesel storage tank for generator in bunded compound and separated from other building in accordance with Australian Standard.<br>- Diesel generators are located in buildings separate to other facilities.<br>- Diesel engine driven pumps for fire fighting are housed in a separate building.<br>- Fire warning and fighting system in operation during process commissioning.<br>Commissioning:<br>- Relevant personnel to be educated in the Environmental Incident Response Plans (D&C PGA and Utilities EIRPs).<br>- Storage of chemicals to be in accordance with industry guidelines and with appropriate signages / warning labels.<br>- Transport, storage and handling of hazardous materials and dangerous goods will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>In addition to this, all relevant personnel are to be educated in the Environmental Incident Response Plan, Site Emergency Response Plan and the site's evacuation procedures. D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.  | G             | E           | 3           | E3                             | Moderate |
| 52     | Potential Emergencies and Abnormal Events  | Hazardous Materials and dangerous goods.<br><br>Manage, store, handle and dispose any hazardous substances and dangerous goods in accordance with relevant policies, regulations and guidelines including the Victorian WorkCover Authority and Australian Standard AS1940 Storage and Handling of Flammable and Combustible Liquids, EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Contamination of air, land and water, and human and ecological health, due to the incorrect separation and segregation of hazardous and dangerous substances. | Pollution of soils, receiving waters or potential harm / injury to personnel, flora and fauna via discharge of hazardous substance. | D                | 4           | D4                              | High<br><br>Mitigation measures include, but are not limited to:<br>Design:<br>- Bulk chemicals are stored in designated bunded areas and design focused on maximise safety and minimise potential to cause environmental impact<br>- All truck unloading areas are designed to capture any spills from the truck unloading operation<br>- Pipe works outside buildings are in culverts or double contained if direct buried.<br>Commissioning:<br>- Pipes will be hydrostatically tested to ensure installation is integral prior to introduction of chemicals<br>- Commissioning of chemical systems will follow procedure COMM-STD-00-PRD-005 - General Commissioning Procedure for Chemical Dosing Systems,<br>- Refer to relevant chemical Commissioning Work Package.<br>- Transport, storage and handling of hazardous materials and dangerous goods will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br><br>In addition to this, all relevant personnel are to be educated in the Environmental Incident Response Plan, Site Emergency Response Plan and the site's evacuation procedures. D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate. | G             | E           | 2           | E2                             | Low      |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity   | Potential Impact (Receptor)   | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)   | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|--|---|--|---|-------------|-------------|---------------------------------|--|---------------|-------------|-------------|--------------------------------|
| 53     | Potential Emergencies and Abnormal Events. | Hazardous Materials and dangerous goods.<br><br>Manage, store, handle and dispose any hazardous substances and dangerous goods in accordance with relevant policies, regulations and guidelines including the Victorian WorkCover Authority and Australian Standard AS1940 Storage and Handling of Flammable and Combustible Liquids, EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996) and EPA Publication 347 – (Bunding Guidelines). | Traffic incident involving the transportation of bulk hazardous materials and dangerous substances.            | Pollution of soils, receiving waters or potential harm/injury to personnel, flora and/or fauna. | C           | 4           | C4 Extreme                      | Refer to Site Traffic Management Plan.<br><br>- All relevant personnel are to be educated in the Environmental Incident Response Plan, Site Emergency Response Plan and the site's evacuation procedures. D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.<br>- Transport, storage and handling of hazardous materials and dangerous goods will be managed as per the Hazardous Materials Sub Plan (Attachment I2 to the D&C PGA EMP).<br>- Transport contractor to have established traffic incident management plan  | VG            | E           | 3           | E3 Moderate                    |
| 54     | Potential Emergencies and Abnormal Events. | Waste General.<br><br>Minimise waste through the adoption of best practice waste reduction and disposal procedures consistent with the EPA waste hierarchy.   | Unforeseen contamination due to inappropriate or illegal disposal of waste.                                    | Environmental contamination.  | C           | 4           | C4 Extreme                      | Refer to the D&C PGA Resource Efficiency Sub Plan (Attachment I6), and Waste Management Plan.<br><br>Control measures include:<br>- Training programs for workforce (waste management is included in the Plant and Utilities site inductions).<br>- Response measures: Control the source of the contamination, assess the risk and source of contamination, implement temporary controls to contain contamination and review commissioning method and control measures, monitor to ensure compliance.<br><br>D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate. | VG            | E           | 3           | E3 Moderate                    |
| 55     | Potential Emergencies and Abnormal Events. | Surface Water Quality and Groundwater.<br><br>Minimise impacts on surface water quality.<br><br>Minimise impact on groundwater.   | Extreme storm event leading to local flash flooding.   | immediate danger to people's safety, environment and damage to equipment.                       | D           | 4           | D4 High                         | Control measures include:<br>Design: Design of plant and roads above the 1 in 100 year flood level.<br>Response measures:<br>- Response Plan to incorporate advance warning forecasts and removal of plant and people to high ground. Monitoring of weather forecasts and communication to workforce.<br>- Site Environmental Manager to communicate predicted inclement weather and flood warnings to Supervisory Groups.<br>- D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.   | VG            | D           | 2           | D2 Low                         |
| 56     | Potential Emergencies and Abnormal Events. | Surface Water Quality and Groundwater.<br><br>Minimise impacts on surface water quality.<br><br>Minimise impact on groundwater.   | Contamination of existing waterways resulting from a storm event greater than the one in two year storm event. | Localized harm to soil and local water quality.   | C           | 4           | C4 Extreme                      | D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.   | VG            | D           | 3           | D3 Moderate                    |



| Risk # | Commissioning Activity                     | Relevant Performance Criteria / Performance Requirements / Aspect   | Potential Hazard resulting from activity  | Potential Impact (Receptor)  | Probability | Consequence | Inherent Risk (Before Controls) | Controls: current or planned prior to work to ensure obligations (including performance requirements and performance criteria) are met (Table 4 - reference specific option)  | Effectiveness | Probability | Consequence | Residual Risk (After Controls) |
|--------|--|---|---|--|-------------|-------------|---------------------------------|---|---------------|-------------|-------------|--------------------------------|
| 57     | Potential Emergencies and Abnormal Events. | Surface Water Quality and Groundwater.<br><br>Minimise impacts on surface water quality.<br><br>Minimise impact on groundwater.   | Design of temporary sediment controls is insufficient for the maximum exposed area.         | Localized harm to soil and local water quality.                            | D           | 4           | D4 High                         | Refer to the Soil Management Sub Plan (Attachment I7 to both the PGA and Utilities D&C EMP).<br><br>Control measures include, but are not limited to the following:<br>- Identifying the cause of any breach and informing EPA.<br>- Commissioning methods and control measures will be reviewed and improved if necessary, modified methods and controls will be monitored to ensure compliance, contingency measures will be taken in accordance with the Emergency Response Plan, where applicable.<br>- Monitoring of weather forecasts and communication to workforce. Site Environmental Manager to communicate predicted inclement weather and flood warnings to Supervisory Groups to ensure preparedness for rainfall events.<br>- Weekly / Daily inspections of sedimentation controls.<br>- D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate. | G             | D           | 3           | D3 Moderate                    |
| 58     | Potential Emergencies and Abnormal Events. | Surface Water Quality and Groundwater.<br><br>Minimise impacts on surface water quality.<br><br>Minimise impact on groundwater.   | Unforeseen water and soil contamination due to fuel or oil spill.                           | Localized harm to soil and local water quality.                            | D           | 4           | D4 High                         | Refer to the Soil Management Sub Plan (Attachment I7 to both the PGA and Utilities D&C EMP).<br><br>Control measures include, but are not limited to the following:<br>- Identifying the cause of any breach and informing EPA.<br>- Commissioning methods and control measures will be reviewed and improved if necessary, modified methods and controls will be monitored to ensure compliance, contingency measures will be taken in accordance with the Emergency Response Plan, where applicable.<br>- D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.  | G             | E           | 3           | E3 Moderate                    |
| 59     | Potential Emergencies and Abnormal Events. | Surface Water Quality and Groundwater.<br><br>Minimise impacts on surface water quality.<br><br>Minimise impact on groundwater.   | Surface water exposed to sediment flow.   | Localized harm to soil and local water quality.                            | C           | 4           | C4 Extreme                      | Refer to the D&C PGA Flora and Fauna Sub Plan and D&C PGA Water Quality and Erosion Management Sub Plan (Attachments I5 and I9 respectively).<br><br>Control measures to mitigate the unlikely event of a waterway exposed to sediment flow are inclusive of, but not limited to:<br>- Stopping works directly or indirectly leading to a breach of sediment controls, instatement of further sediment control measures (egg. geotextile membrane covered straw bales).<br>- Salvage and translocation measures will be enacted to remove any significant species at risk.<br>- D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.  | VG            | E           | 3           | E3 Moderate                    |
| 60     | Potential Emergencies and Abnormal Events. | Marine Flora and Fauna - Outlet.<br><br>Comply with the State Environment Protection Policy (Waters of Victoria).<br><br>No observable accumulation of solid matter or staining on the beach. | Discharge of off specification water to marine environment or other uncontrolled discharge. | Localised impact to water quality and/or impact to marine flora and fauna. | C           | 3           | C3 High                         | Process of investigation and progressive shut down in response to level 2 (alarm) trigger and Water Quality Parameter breaches as outlined by Commissioning Environmental Monitoring and Control Procedure.<br>- Continuous discharge outfall chamber WQ control parameters.<br>- Warning triggers and Alarm triggers. Further details of the automated monitoring systems are detailed in the Commissioning Environmental Monitoring and Control Procedure (TDV-2-EV-PRD-0006-00).<br>- SCADA system.<br>- Relevant staff trained in the appropriate management of process parameter excursions, unplanned discharges and emergency response in accordance with the D&C PGA and Utilities EIRPs as appropriate.<br>- D&C Plant and Utilities EIRPs to be followed in emergency situations and for all incidents as appropriate.  | VG            | D           | 2           | D2 Low                         |

## ATTACHMENT C - ENVIRONMENTAL CONSEQUENCE LEVEL DEFINITIONS

| Consequence Level    |  | 1 - Negligible   | 2 - Minor   | 3 - Moderate   | 4 - Major  | 5 - Extreme  |
|----------------------|--|--|---|--|--|--|
| <b>Category</b>      | <b>Sub Category</b>  | <b>Minimal impact in a localised area within natural variability</b>   | <b>Low impact in a localised or regional area with a functional recovery within less than 1 year</b>  | <b>Medium impact in a localised or regional area with a functional recover of 1 to 5 years</b>   | <b>High impact in a localised or regional area with a functional recovery within 5 to 10 years</b>   | <b>Very high impact in a regional area with functional recover in greater than 10 years if at all</b>  |
| <b>Environmental</b> | <b>Ecosystem Function (need to consider resilience and resistance)</b> | Alteration or disturbance to ecosystem interactions in the localised area, if any, unlikely to be detectable and within expected natural seasonal variation / occurrence.                        | Alteration or disturbance to ecosystem interaction in the localised or regional area, may be detectable but within expected natural annual variation / occurrence.<br><br>Functional recovery within less than 1 year.  | Alteration or disturbance to ecosystem interactions in the localised or regional area, detectable but within expected natural short-term variation / occurrence.<br><br>Functional recovery within 1 to 5 years. | Alteration or disturbance to ecosystem interactions in the localised or regional area, detectable and beyond expected natural variation / occurrence.<br><br>Functional recovery within 5 to 10 years. | Alteration or disturbance to ecosystem interactions in the regional area, substantially beyond expected natural variation / occurrence to irreversible.<br><br>Functional recovery in greater than 10 years if at all. |
|                      | <b>Fauna and Flora Communities and Species</b>                         | Loss of individuals not apparent and without reduction in localised population viability (e.g. Mortality likely to be no greater than population experiences within natural annual variability). | Loss of small number of individuals without reduction in viability of population in the localised or regional area (e.g. Mortality likely to be no greater than population experiences within natural annual variability).<br><br>Functional recovery within less than 1 year | Loss of individuals leads to reduction in viability of population in the localised or regional area.<br><br>Functional recovery within 1 to 5 years.   | Loss of large number of individuals leads to a high impact on populations in the localised or regional area.<br><br>Functional recovery within 5 to 10 years.  | Long-term impact on populations in the regional area that may not be recoverable.<br><br>Functional recovery in greater than 10 years if at all.   |
| <b>Social</b>        | <b>Aboriginal Heritage Sites</b>                                       | No measurable impact on indigenous heritage sites in the project area.   | Partial removal of one or more indigenous archaeological sites of low significance.   | Complete or partial disturbance to between one and five indigenous archaeological sites of low to moderate significance.   | Complete or partial disturbance to six or more indigenous archaeological sites of low-moderate significance.   | Complete or partial disturbance to one or more indigenous archaeological sites of high significance.   |
|                      | <b>Historical Heritage Sites</b>                                       | No measurable impact on historical heritage sites.   | Detectable impact to state or Commonwealth significant site with heritage values remaining largely intact.  | Partial reduction in heritage value intrinsic to state or Commonwealth significant site.   | Substantial reduction in heritage value intrinsic to state or Commonwealth significant site.   | Complete loss of heritage value intrinsic to state or Commonwealth significant site.   |
|                      | <b>Maritime Heritage Sites</b>   | No measurable impact on maritime heritage sites.   | Detectable impact to state or Commonwealth significant site with heritage values remaining largely intact.  | Partial reduction in heritage value intrinsic to state or Commonwealth significant site.   | Substantial reduction in heritage value intrinsic to state or Commonwealth significant site.   | Complete loss of heritage value intrinsic to state or Commonwealth significant site.   |
|                      | <b>Health and Safety</b>   | Injury or illness treatable by basic first aid - no lasting effects on health.   | Injury or illness requires professional medical assistance to treat.  | Injury or illness requires admittance to hospital to treat.  | Serious injury or illness requiring long term medical treatment.   | Fatality or permanent disability as a result of injury or illness.   |

|  |  |   |   |  |   |   |
|--|--|---|---|--|---|---|
|  | <b>Recreation</b>  | Temporary and localised impacts on recreation - no lasting effects.   | Short term impacts on recreational activities within the localised area or regional area.<br><br>Functional recovery within less than 1 year. | Impacts on recreational activities within the localised area or regional area that negatively impact on access to recreation opportunities and/or participation rates.<br><br>Functional recovery within 1 to 5 years. | Impacts on recreational activities within the localised area or regional area that significantly negatively impact on access to recreation opportunities and/or participation rates.<br><br>Functional recovery within 5 to 10 years. | Access to recreational activities within the regional area permanently reduced.<br><br>Functional recovery in greater than 10 years if at all.  |
|  | <b>Amenity (Physical factors e.g. Noise, air and water etc.)</b> | Temporary localised impacts on amenity - no lasting effects.  | Short term impacts on amenity to the localised area or regional area.<br><br>Functional recovery within less than 1 year.                     | Impacts on amenity to the localised area or regional area that negatively alter perceptions of the area.<br><br>Functional recovery within 1 to 5 years.   | Impacts on amenity to the localised area or regional area that significantly negatively alter perceptions of the area.<br><br>Functional recovery within 5 to 10 years.   | Amenity of the regional area permanently negatively altered.<br><br>Functional recovery in greater than 10 years if at all.   |
|  | <b>Tourism</b>   | Limited and short-term reduction in tourist visitation not outside usual variation.<br><br>No significant impact on tourism businesses. Region still seen as attractive place to visit.<br><br>No recovery necessary. | Short-term reduction in tourism use.<br><br>Recovery within less than 1 year.   | Reduction in tourism use.<br><br>Recovery within 1 to 5 years.   | Large reduction of tourism uses.<br><br>Business viability compromised across wide range of sectors with substantial business failure in both direct and flow-on sectors.<br><br>Recovery within 5 to 10 years.                       | Permanent loss of iconic tourism assets of regional significance.<br><br>Large flow-on effects to supporting businesses.<br><br>Functional recovery in greater than 10 years if at all. |
|  | <b>Commercial Fishing</b>  | Limited and short-term reduction in activity within the localised area.<br><br>No significant impact on businesses.<br><br>No recovery necessary.   | Short-term reduction in commercial activity, in the localised area or regional area.<br><br>Functional recovery within less than 1 year.      | Reduction of 5 - 30% in sustainable yield of the fishery in the localised area or  | Reduction of 30 - 90% in sustainable yield of the fishery in the localised area or regional area.<br><br>Functional recovery within 5 to 10 years.  | Commercial fishing completely and permanently prohibited or destroyed in the regional area.<br><br>Functional recovery in greater than 10 years if at all.                              |
|  | <b>Labour Markets</b>  | Limited and short-term impact on labour markets.<br><br>No significant impact on business operations.<br><br>No recovery necessary.   | Short-term reduction in available local labour.<br><br>Functional recovery within less than 1 year.   | Medium-term reduction in available local labour.<br><br>Functional recovery within 1 to 5 years.   | Large reduction in available local labour.<br><br>Business viability compromised across wide range of sectors.<br><br>Functional recovery within 5 to 10 years.   | Permanent loss of local labour.<br><br>Large flow on effects to local businesses.<br><br>Functional recovery in greater than 10 years if at all.  |