ENVIROPACIFIC SERVICES

Water Treatment Plant Management Plan

HAKK Temporary Water Treatment Plant (TWTP)

Document Number 105079-Q-1000

Revision	Date	Prepared	Reviewed	Approved	Issue Description
A	29/09/2021	AB	PP		Draft issued to Daracon/HAKK for comment
B2	12/12/2021	PP			Revised document after Hydro/Rambol comments

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1 General

1.1 Introduction

This Water Treatment Management Plan document has been prepared to provide design, commissioning, testing and operational methodology for the Temporary Water Treatment Plant (TWTP) that is to be constructed on site for the Hydro Aluminium Kurri Kurri (HAKK) Remediation Smelter Project.

1.2 Project Summary

The Hydro Aluminium Kurri Kurri (HAKK) Remediation Smelter Project will include the construction of an onsite Temporary Water Treatment Plant (TWTP) to treat leachate produced from the site to a quality suitable for discharge to the environment. The TWTP is expected to remain in operation for up to three years.

Figure 1 Site map showing location of the TWTP

Enviropacific is contracted to supply and install (including mechanical and electrical works) the TWTP as well as operate and maintain the system including supply of chemicals and materials as required throughout the duration of the project.

The proposed treatment system will be automated with each piece of the plant being controlled by Programmable Logic Controllers (PLC) which also allow for remote data access, remote monitoring/control

and process alarms and interlocks. Site attendance will be required for the operation of the plant to allow for the chosen batch operation methodology, process optimisation, various cleaning cycles and maintenance tasks.

The plant is expected to treat and discharge a maximum of 2,400 kL/month. Based on estimates of leachate generation from the relevant Project elements the TWTP will require an estimated capacity of 30 kL/day.

Once the TWTP has been installed a series of testing, commissioning and process proving processes will be conducted to ensure the system meets the design and performance requirements.

The TWTP will be supplied with leachate from a 1ML Capacity Leachate Holding Pond and includes 4 x 100kL capacity Treated Water Tanks which will be filled in batches to allow for sampling and testing of treated water to occur prior to discharge both during commissioning and normal operation. After successful commissioning of the TWTP has been completed, the batch tested treated water will be discharged via gravity from Treated Water Tanks to the chosen environmental discharge point.

1.3 Objectives of the Plan

The primary objective of this plan is to describe how the design, commissioning, testing and operational methodology for the TWTP. It is also to address the requirements of Condition B19A of the development consent for SSD 6666 (through Modification 1). The following table identifies these requirements, and where they are addressed in this plan.

Condition	**Where addressed in this plan**
B19A. Prior to operation of the Temporary Water Treatment Plant (TWTP), the Applicant must prepare, to the satisfaction of the Planning Secretary, a TWTP Management Plan that includes, but is not limited to, details regarding treatment processes and commissioning and operation stage management protocols. The TWTP Management Plan must be prepared in consultation with the EPA and include, at a minimum:	
(a) specifications and final design details of the TWTP, including expected treatment performance for all pollutants of concern;	Section 2
(b) a TWTP commissioning stage monitoring program that includes:	Section 3
i. the collection and collation of data on both the influent and treated effluent quality for all pollutants of concern; and	Section 3.3

Condition	Where addressed in this plan
ii. a verification process to ensure that the treated water quality is consistent with the 'Treated Leachate Target Values' (Document: Hydro Kurri Kurri Aluminium Smelter Remediation-Mod-1 (SSD-6666-Mod-1): Additional Information, dated 31 July 2021) before discharge to the North Dam	Section 3.3
(c) a TWTP operational stage monitoring program that ensures each treated effluent batch meets all the 'Treated Leachate Target Values' prior to discharge to the North Dam;	Section 4.3
(d) protocols and operational rules in the event the treated effluent does not meet all the 'Treated Leachate Target Values' including but not limited to:	Section 4
i. recirculation through the TWTP	Section 4.3
ii. offsite removal by tanker for disposal at a licensed facility	Section 4.2
(e) details of the timing and implementation of decommissioning of the TWTP	Section 5

As required by Condition 19A Hydro consulted with the Environment Protection Authority (EPA) during preparation of this Water Treatment Management Plan. As noted in the correspondence provided in Appendix 3 the EPA had no comments on specific content for the plan.

2 TWTP Design

2.1 Discharge Criteria

The discharge criteria for the TWTP system is as per Table 1: Treated Leachate Target Values shown below:

Table 1 Treated Leachate Target Values

Treated Leachate Target Values		
Paremeter	Units of Measure	Limit
Fluoride	mg/L	15
Free Cyanide	mg/L	<0.005
Total oils and grease	-	No visual sheen
pH	-	6.5-8
Total Suspended Solids (TSS)	mg/L	<50
Total Dissolved Solids (TDS)	mg/L	None specified
Total Polyaromatic Hydrocarbons (PAHs)	µg/L	LOR (<1)
Total Recoverable Hydrocarbons (TRH)	µg/L	LOR (<100)
Aluminium	mg/L	5
Arsenic	mg/L	0.1
Beryllium	mg/L	0.1
Boron	mg/L	0.5
Cadmium	mg/L	0.01
Chromium	mg/L	0.1
Cobalt	mg/L	0.05
Copper	mg/L	0.2
Iron	mg/L	0.2
Lead	mg/L	2
Lithium	mg/L	2.5
Manganese	mg/L	0.2
Mercury	mg/L	0.002
Molybdenum	mg/L	0.01
Nickel	mg/L	0.2
Selenium	mg/L	0.02
Uranium	mg/L	0.01
Vanadium	mg/L	0.1
Zinc	mg/L	2
PFOS and PFHxS	µg/L	0.07[1]
PFOA	µg/L	0.56[1]

Note:

1. The ADWG for PFAS and PFHxS and PFOA has been adopted for discharge

2.2 Treatment System Components

The TWTP is comprised of the following main components:

- Leachate Holding Pond (1 ML capacity)
- Flow Balance Tank (50 kL capacity) & Recirculation system for pH adjustment
- Chemical dosing including storage and dosing pump systems for:
    - Acid (1,000L capacity)
    - Caustic (1,000L capacity)
    - Coagulants (500L capacity)
    - Oxidant (500L capacity)
    - Flocculent (500L capacity)
- Reaction Tank and Clarifier for precipitation and removal of large flocs
- LDAF with scraper for removal of remaining flocs, fine solids, grit removal and any oils and greases
- Sludge Dewatering bags for sludge removal
- Break tanks (3 x 10 kL capacity) with Recirculation systems for pH adjustment
- Media Filtration & Ion Exchange Filtration – Removal of suspended solids, dissolved contaminants and polishing
- Treated Water Tanks (4 x 100kL capacity)
    - Filled in batches where samples will be taken and analysed prior to discharge to the licensed discharge point.

2.3 Design Capacity

The maximum hydraulic capacity of the TWTP is 3L/s however the plant is designed and expected to treat and discharge a maximum of 2,400 kL/month. Based on estimates of leachate generation from the relevant Project elements the TWTP will require an estimated capacity of 30 kL/day.

2.4 Process Description

The purpose of the TWTP is to treat water from a 1ML capacity Leachate Holding Pond to produce treated water to meet the requirements outlined in *Table 1 Treated Leachate Target Values*

Leachate from the Leachate Holding Pond (1ML capacity) will be pumped to a 50kL Flow Balance Tank. At the inlet of the Flow Balance Tank the water will be sampled to take a representative sample of the raw leachate. The contents of the Flow Balance Tank is recirculated using a Recirculation Pump which allows the contents of the tank to be dosed with Acid (pH adjustment) and an Oxidant (To assist with the Oxidation of Cyanide) to start the pre-treatment process. The contents of the Flow Balance Tank is pH

adjusted to ensure that the high-pH leachate is optimized to remove targeted contaminants during the pre-treatment steps.

A Clarifier Feed Pump will pump water from the Flow Balance Tank to a Reaction Tank and Clarifier. The Clarifier Feed Pump will be interlocked if the pH of the leachate in the Flow Balance Tank is not within the operator set points. Coagulants and polymer are dosed in the feed pipework of the Reaction Tank to target the precipitation and removal of bulk solids as well as other contaminants including heavy metals and Fluoride. The Clarifier is designed to remove bulk solids that will settle out and reduce solids loading on the Dissolved Air Flotation (DAF) system. Water from the clarifier enters the DAF where any remaining fine and bulk solids, oils and grease will be removed via both flotation and settling.

DAF product water is collected in a Break Tank which includes a Recirculation Pump which operates to continuously provide a well-mixed tank and to allow pH adjustment of the Break Tank if required. Both Acid and Caustic can be dosed in to this Recirculation pipeline if required to meet the pH setpoint inputted at the control panel by the Operator. The pH of the water in the Break Tank is controlled to ensure an optimum pH level is maintained to feed water to Container 1 and Container 2 to ensure the selected Multimedia and Ion Exchange Resins in these systems are able to target specific contaminants of concern. A Filter Feed Pump in each Container will draw water from the Break Tank and pump it through the filter vessels to the next Break Tank.

Container 1 and 2 include Zeolite filtration, Granular Activated Carbon (GAC) filters as well as IX resins. GAC removes a range of compounds including dissolved phase hydrocarbons, fluoride and cyanide through the process of adsorption. Organic and inorganic compounds in the water are attracted to the surface of the activated carbon.

The second Break Tank also includes a Recirculation Pump which operates to continuously provide a well-mixed tank and to allow pH adjustment of the Break Tank if required. Both Acid and Caustic can be dosed in to this Recirculation pipeline if required to meet the pH setpoint inputted at the control panel by the Operator. The pH of the water in the Break Tank is controlled to ensure an optimum pH level is maintained to feed water to Container 3 to ensure the selected Multimedia and Ion Exchange Resins in these systems are able to target specific contaminants of concern. Different resins are more effective at certain pH levels so the pH adjustment in the Break Tanks is an important part of the treatment process. IX resins have been selected to target:

- Cyanide
- Fluoride
- Uranium
- Heavy metals

- PFOS and PFOA

A Filter Feed Pump in Container 3 will draw water from the second Break Tank and pump it through the filter vessels to the Treated Water Tanks. The Treated Water Tanks will include 4 x 100kL capacity tanks. The operation of the Treated Water Tanks will be manual and they will be isolated by the operator to ensure that only one tank is being filled at a time. Each of the tanks will have a Level Transmitter in them to alert and operator and to stop the Filter Feed Pump of Container 3 if the tank reaches capacity. If a tank reaches capacity, the operator will isolate the tank and open another tank to allow another batch process to occur.

Once a tank reaches capacity, a Recirculation Pump will be connected to the tank to mix the tank to ensure that a representative sample of the water in the tank can be taken. This water will be sent for analysis at the lab and if the water is suitable it will be gravity discharged to the environment.

If the water quality is not at the required discharge limits, the water in the treated water tank will be pumped back to the Leachate Holding Pond for re-treatment.

2.5 By-Product Management & Disposal

Sludge will be produced in the form of settled solids from both the Clarifier and DAF units. Sludge will be pumped out from the bottom of the Clarifier and DAF unit and into a sludge dewatering Geotube. The removed sludge will be dried and disposed of within the Containment Cell while available and to an offsite licensed waste facility when the Containment Cell has been capped. The filtered leachate will then pass back through the pre-treatment system.

Another by-product which will be generated by the TWTP is filter media which will be sucked out of the filters for disposal when required. The filter media will only be removed when “breakthrough” has occurred. Breakthrough occurs when the media is fully loaded with the contaminant and has no more capacity to remove any more of a targeted contaminant. The waste product will be removed from the filter and will be classified, collected and disposed offsite in a licenced facility.

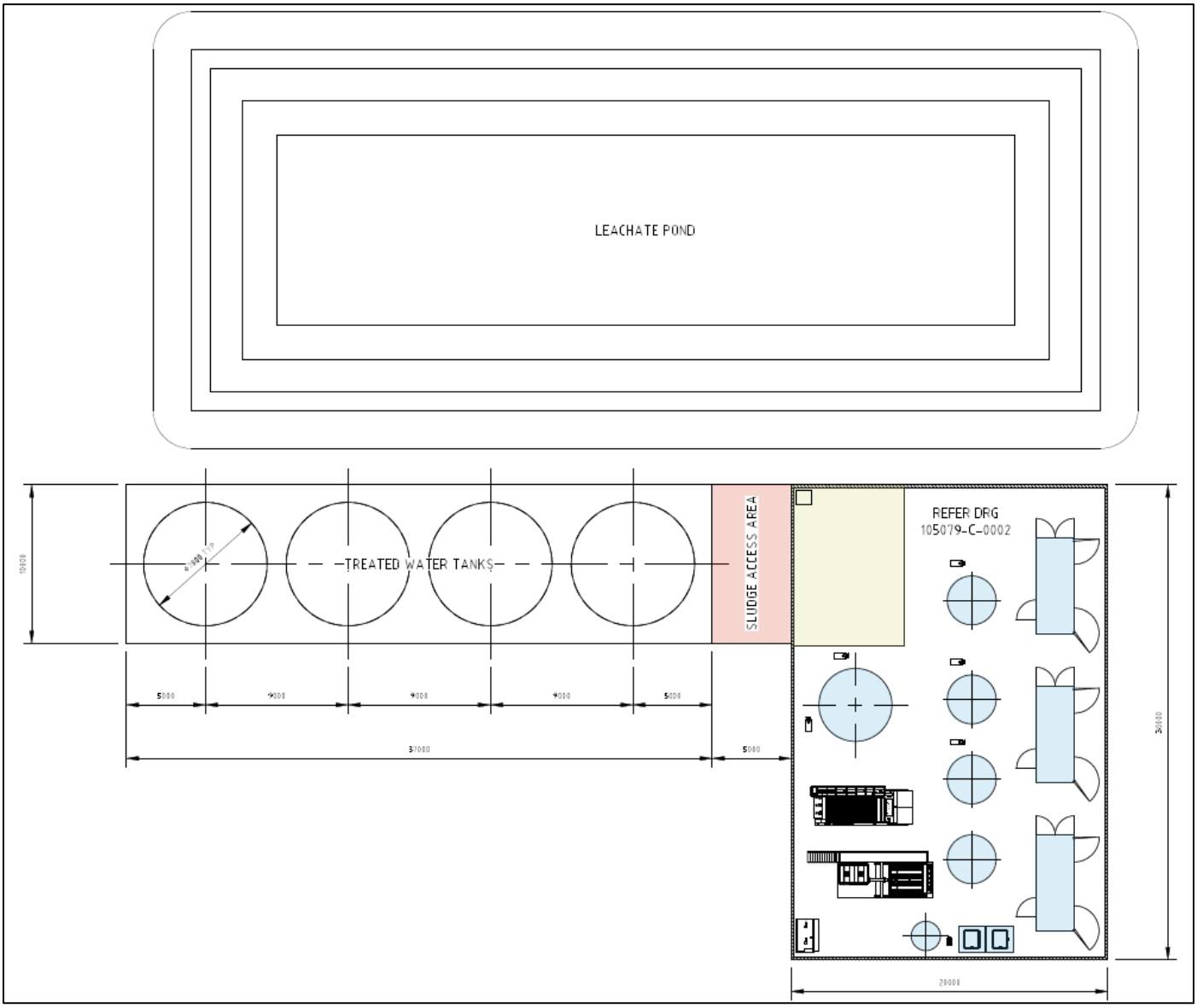

Figure 2 Layout of the TWTP

3 Commissioning & Testing Plan

3.1 General

3.1.1 Introduction

This plan includes the primary commissioning and testing information, but this document is to be used in association with the inspection test reports (ITRs) listed herein. This Plan has been developed to ensure:

- Testing and commissioning of the TWTP is undertaken in a systematic and safe manner
- TWTP process equipment functions and performs as per designs and specifications
- No uncontrolled discharge of water

3.1.2 Scope

The scope of the Commissioning & Testing Plan is to address TWTP commissioning and testing which involves three phases: Preparation, Implementation, and Closeout.

3.2 Preparation

3.2.1 Commissioning team roles and responsibilities

The below provides a breakdown of the commissioning team structure, roles, and responsibilities.

Table 2: Roles and Responsibilities

Role	Responsibility	Duties
Project Manager Patrick Puddefoot	Overall responsibility for project deliverables Oversee all works and provide assistance and sign off when required	Ensure all commissioning activities run to schedule Facilitate hand over General oversight and planning of commissioning and testing activities and progress
Safety Coordinator Fola Ladiran	Review work procedures and safe work method statements (SWMS) such that they comply with Enviropacific Safety Procedures	Develop safety documentation Ensuring all involved in commissioning are inducted and signed on to the SWMS Ensure that commissioning work complies with relevant safety standards and guidelines Ensure that all work procedures are followed, and work carried out according to SWMS
Site Supervisor James Bowden	Oversee all works and provide technical assistance and sign off when required. Supervise and direct staff	Assist Commissioning Manager and Commissioning Engineer Supervise works and co-ordinate Sub-Contractors Organise, execute and witness all mechanical inspections on pipe work, tanks, and equipment Assist in the development and completion of all documentation such that hydro testing, pipe work cleaning, tank installation, and equipment installation and initial run-in is completed to schedule and the plant is ready for process commissioning. Ensure that no equipment/vessel is finally closed prior to the inspection and approval from the commissioning team Address engineering deficiencies and punch list activities and close out Participate in all coordination, scheduling, safety and progress review meetings

Role	Responsibility	Duties
Commissioning Team Lead Patrick Puddefoot	Responsible for the management of commissioning activities; Systemization, planning, pre-commissioning, wet and dry commissioning	Organize, supervise and direct all commissioning activities and personnel. Systemize the TWTP into commissioning systems, to affect most efficient TWTP start up Manage development and validation of commissioning procedures and check sheets. Complete review and finalization of all documentation. Ensuring all related training and inductions are organized for the team Manage and direct all commissioning and start-up activities Participate in all coordination, scheduling, safety and progress review meetings Ensure all instrument and electrical checkouts and tests are completed. Ensure control system is checked addressing all scenarios of operations and interlocks. Review HAZOP actions and update all commissioning documentation post start up. Completion and coordination of third party sign off on all ITRs & ITPs for commissioning.

Role	Responsibility	Duties
Commissioning Engineer Fola Ladiran	Responsible for execution of all commissioning activities, input as required into system planning, direct or execute pre-commissioning, pressure leak testing, wet and dry commissioning. Start up and validation testing of the systems, assist as required with loop, motor and interlock checking	Organize the execution of all commissioning activities Create all commissioning documentation and check sheets. These documents will be provided as we progress and upon completion of commissioning. Prepare and deliver training packages Develop punch lists Perform all commissioning and start-up activities safely and to schedule Participate in all coordination, scheduling, safety and progress review meeting Ensure and assist as required that all instruments and electrical tests are complete Ensure and assist as required to check the control system functions, interlocks and start-up and shut downs Ensure that instruments, major process equipment, and chemical piping labelled Update all commissioning documentation post start up
Control/Electrical/ Instrumentation Commissioning Engineer Micah Smith (represents MSI Electrical managed by Enviropacific)	Responsible for execution of all electrical, control and instrumentation checks	Organize, execute, witness and document all electrical, control and instrumentation checkout. Develop all loop testing and electrical documentation and check sheets Ensure standard is upheld on all instruments, instrument cables, motor cables, I/O panels and panel labelling Develop ITRs for loop testing, interlock testing, start-up testing, shutdown testing and electrical and motor checks Develop ITRs for PLC systems checking and testing Conduct site acceptance test (SAT) and get the approval from the commissioning team lead

3.2.2 Reviewing and updating engineering information

As part of the preparation phase, the following engineering documentation will be reviewed and updated to as built:

- PFD's
- Equipment and instrument schedules
- General arrangement diagram

3.2.3 Commissioning Documentation

For commissioning of the TWTP, pre-commissioning and commissioning inspection test plans (ITPs) are developed along with inspection test reports (ITRs) as an integral part of this commissioning and test plan.

Refer to the Appendices for the following ITPs:

- Formwork & Slab ITP-01
- Pre-commissioning: ITP-02
- Dry Commissioning: ITP-03
- Wet Commissioning: ITP-04
- Process Commissioning: ITP-05
- Operaton of the TWTP: ITP-06

Refer to Appendices for a full suite of commissioning ITRs

3.2.4 Operator Training

Enviropacific will conduct training sessions for their operations personnel. The first session will be classroom based. The first session will cover process fundamentals, design basis, major equipment items, plant operation and control including protection philosophy.

The second session of the training will be conducted at the completion of commissioning and it will cover troubleshooting, maintenance overview, daily system checks, equipment start-up, shutdown, standby. The site based (session#2) training will have two components;

- Operator training on the process
- Plant control system training

Operator competency to be assessed and documented by Enviropacific after commissioning and a record of trained and qualified operators will be kept.

3.2.5 Safety during commissioning activities

The SWMS and procedures developed at the preparation stage to ensure the safety of the personnel during commissioning is submitted in the Appendices.The following SWMS and procedure will be followed on the basis of requirement.

- TWTP establishment, construction and commissioning SWMS
- The equipment isolation and permit procedure will be followed as and when required. The entire plant should be locked out and then slowly released by the permit authorised person in control, so that it cannot be energised or allowed to introduce water prior to finalisation of the commissioning process. Adhere to lock out tag out procedure and permit to work on isolated energised systems.

3.2.6 Environmental considerations

Chemical spill prevention and control

During the process commissioning stage several chemicals are required to be available for the treatment process. The water treatment plant utilises the following chemicals during normal operation. The chemicals used are:

- Acid (1,000L capacity)
- Caustic (1,000L capacity)
- Coagulants (500L capacity)
- Oxidant (500L capacity)
- Flocculent (500L capacity)

All chemicals are transferred into the respective storage tanks from pails or are provided in IBC's. During unloading of chemicals, all precautionary measures will be taken to prevent any spillages and also ensure compatible spill kits are available to absorb the chemical should any spillage occur. Measures to be taken in the event of an accidental release are provided in the relevant SDS.

WARNING: *Care should be taken when interacting with the chemicals and anyone working with or around the chemicals should read and understand the relevant SDS documents. All appropriate PPE should be worn when interacting with the chemicals in the water treatment plant.*

WARNING: *A number of the chemicals utilised in the water treatment plant are incompatible with each other so extreme care must be taken when replacing chemicals to ensure that the correct chemicals are attached to the correct storage vessel prior to any chemicals being transferred.*

Disposing process streams during commissioning

Potable water will be used for pressure and hydrostatic testing. The water used for hydrostatic testing of any tanks will be used for pipe pressure testing and finally used for wet commissioning. This negates the need to discharge any water during plant commissioning. Any spills or leaks during commissioning process will flow into the plant sump which will then automatically pump (based on sump level) into the Flow Balance Tank. Once wet commissioning has been completed, the potable water in the plant will be treated and tested to confirm it meets discharge criteria before it is discharged to the ischarge location under batch conditions.

3.3 Implementation / Commissioning

3.3.1 Commissioning phases

Commissioning includes the following steps and activities:

Pre-commissioning

- Completion of mechanical and electrical installation
- Filling and flushing of equipment to remove swarf
- Loading of media into filter vessels

Dry Commissioning

- Plant control system
- Motor checks
- Calibration of instruments
- Testing of instruments
- Interlock testing;
- Equipment functional testing;
- Services testing – including service testing of pipework, rectification of defects such as leaks, quality testing, and inspection of lines
- Operational sequence testing, including start up, shut down;
- Out of service (OOS) mode testing

Wet commissioning with potable water:

Potable water is introduced to the process and initial commissioning of the system and its major plant items can be undertaken, putting the process through its operating scenarios to replicate, in the most suitable manner possible, the normal operation of the TWTP. This is to ensure that the plant operates as specified in the functional description, under all operating conditions.

Process commissioning

In this phase, raw water will be introduced to the TWTP. The plant will be operated in auto mode to check its intended functionality and operation. The system setpoints will be determined and optimised.

Performance testing

During commissioning, proof of performance testing will be carried out to confirm that the design satisfies the performance requirements.

During this period of commissioning the following will be demonstrated.

Table 3: Performance Parameters

Parameter	Requirement
Treatment capacity	TWTP is able to treat a continuous raw water flow up to a maximum of 3L/s
Performance	TWTP is able to reduce water contaminant levels to the limits outlined in Table 1
Control system	Control system operates as per the functional specification
Operation	The system can be operated safely and, in the manner intended
Sampling & Testing Regime	Raw leachate and treated leachate samples will be taken to be sent to a NATA accredited lab for analytes. Results will be compiled and shared with the client for approval prior to discharge of any treated leachate. If the treated water does not meet the Target Values (Refer Section 2.1), the leachate will be pumped back to the Leachate Holding Pond for re-treatment as shown in Figure 3.

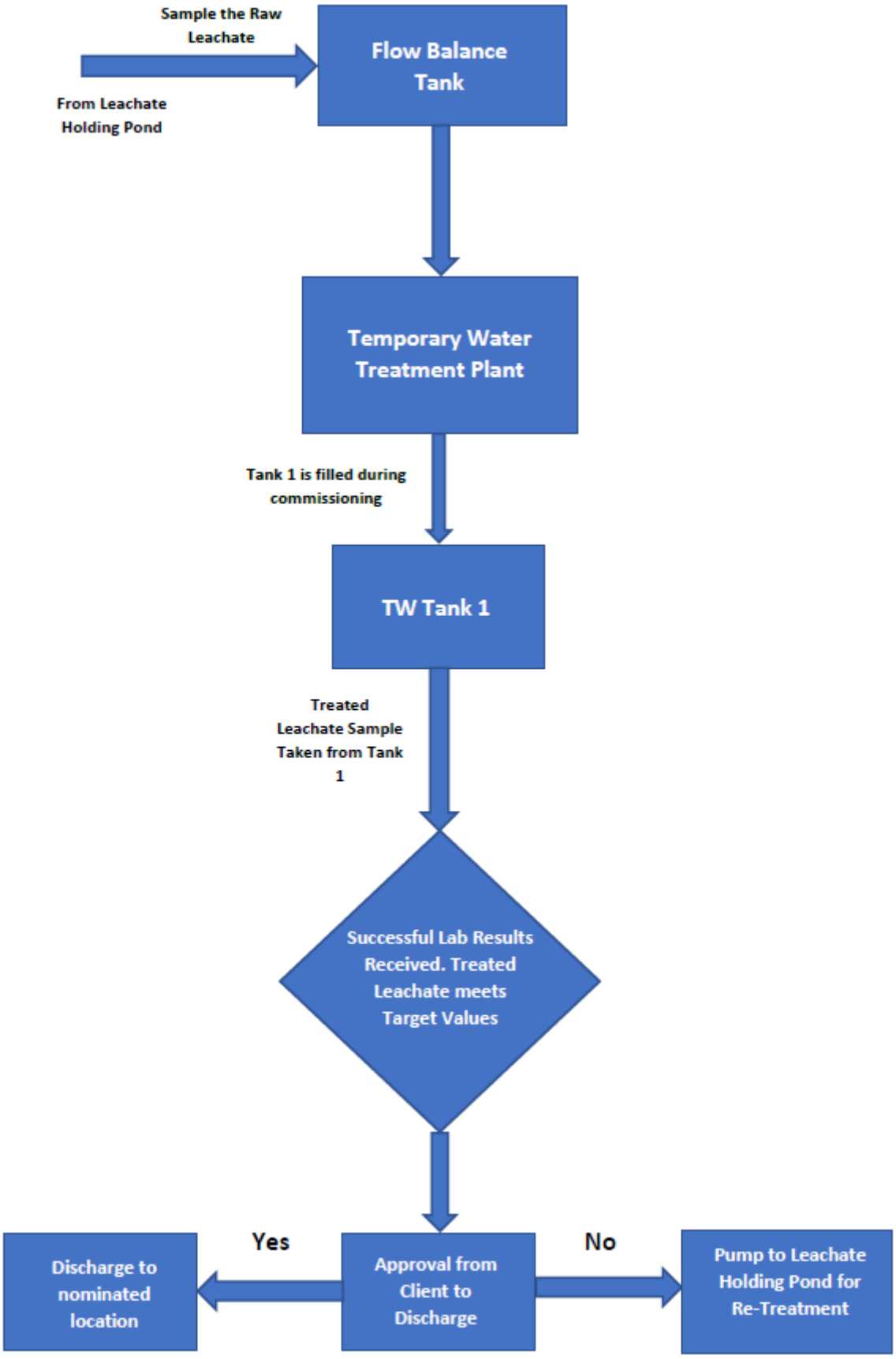

Figure 3 Commissioning sequence prior to any discharge of treated leachate

3.4 Close Out

3.4.1 Completion of punch list items

All ITR actions will be completed and all documentation will be reviewed. The punch list items that were generated in the commissioning phases that are outstanding will be closed out at this stage.

3.4.2 Commissioning Report

All signed ITP's and ITR's will be submitted as a combined commissioning report.

4 Operation of TWTP

4.1.1 Operation team roles and responsibilities

The below provides a breakdown of the Operations team structure, roles, and responsibilities.

Table 4: Roles and Responsibilities

Role	Responsibility	Duties
Project Manager Patrick Puddefoot	Overall responsibility for project deliverables Oversee all works and provide assistance and sign off when required	Ensure all operation activities run to schedule General oversight and planning of operation, maintenance activities and project progress
Site Manager and Operator James Bowden	Operate the TWTP Oversee all works and provide technical assistance and sign off when required. Supervise and direct staff Review work procedures and safe work method statements (SWMS) such that they comply with Enviropacific Safety Procedures	Operate and maintain the TWTP on a daily basis Ensure that Operation ITP's for discharge of treated leachate are completed prior to discharge of any treated leachate Supervise works and co-ordinate Sub-Contractors Organise, execute and witness all mechanical inspections on pipe work, tanks, and equipment during operation and maintenance activities Address engineering deficiencies and punch list activities and close out Participate in all coordination, scheduling, safety and progress review meetings Ensure that all work procedures are followed, and work carried out according to SWMS

4.2 Ongoing Operation & Maintenance

As part of the treatment process implementation, Enviropacific will have its trained operators undertake regular service and maintenance of the system throughout the operation phase. Even though the system is mostly automatic and can run by itself, attendance will be required for the following activities.

- Normal operation of the batch treatment process
- Safety & Quality documentation;
- Optimisation of the overall system performance & adapting to site requirements;
- Inspection and servicing of pumps and equipment;
- Probe cleaning and calibration;
- Clarifier and LDAF cleaning;
- Monitoring, procuring and pump out of chemicals and consumables;
- Sample collection and freighting to lab for analysis;

- Daily/weekly/monthly performance recording and reporting;
- Remote monitoring;
- Emergency attendance and troubleshooting;

4.3 Operational Methodology

During normal operation, the site-specific operation and sampling regime can be summarized as shown in Figure 4 below:

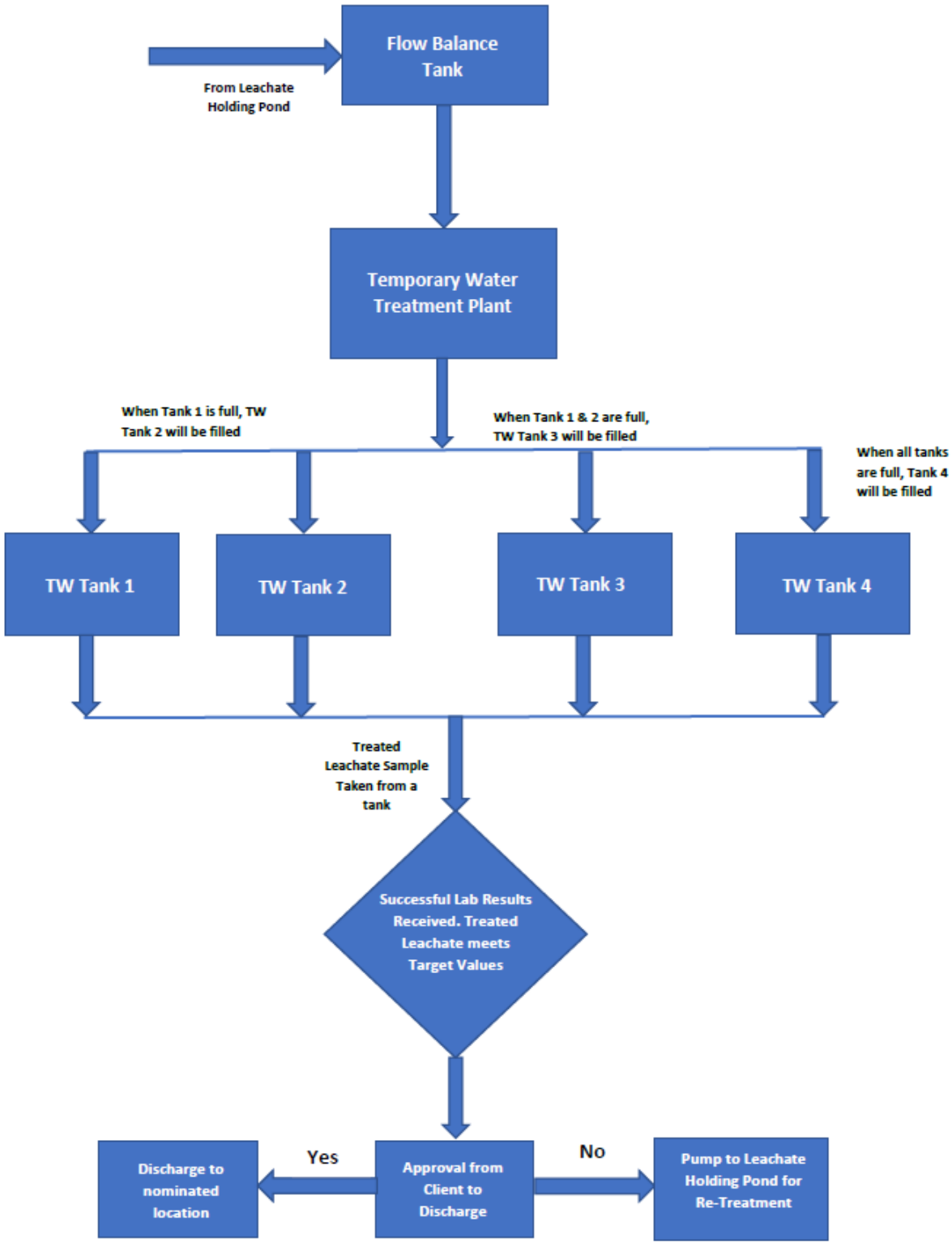

Figure 4 Operation and sampling regime for discharge of treated leachate

An Enviropacific operator will always be on site for the operation of the TWTP. During normal operation the TWTP will send treated water to one Treated Water Tank at a time. When that tank is full then the next tank will start filling.

When a Treated Water tank is full, a sample of the water will be taken and sent to a NATA accredited lab for analysis.

During normal operation, the plant operator will always complete an Inspection Test Report for the operation and sampling of raw and treated leachate. The relevant document is *ITR-06 – Operation of the TWTP, Discharge of Treated Leachate.* This report will include the following steps:

- Provide raw leachate to the TWTP
- Sample the raw feed to the Flow Balance Tank prior to pH correction
- Operate and optimize the TWTP operation
- Sample the Treated Leachate when one of the Treated Water Tanks is full and send to a NATA accredited lab for analysis
- Collate raw and treated analysis report and check if Target criteria has been met.
- Share the raw and treated analysis report with the client for review and approval
- Client sign off for approval to discharge the treated water

By implementing the use of the Inspection Test Plan and Report, the risk of discharging treated leachate that doesn't meet the Leachate Target Values will be greatly reduced as multiple people and approvals will be required prior to any water being released from a Treated Water Tank.

If there is a failure in the operation of the TWTP and the Approval to Discharge is not provided, the treated leachate will be pumped back into the Leachate Holding Pond for re-treatment as per the operation flow chart shown in Figure 4.

The capacity of water in the Leachate Holding Pond will be managed so that there is capacity left in the system to allow for this if a failure did occur. In the event that there was no capacity in the Leachate Holding Pond (e.g during a significant rain event) to allow for re-circulation of the treated leachate, the water will be removed from the Treated Water Tank using a tanker and it will be sent to an offsite water treatment plant for processing.

4.4 Monitoring and Alarms Management

Continuous monitoring of the water throughout the TWTP is done using built in instrumentation and alarm systems. If the water is ever measured to be out of spec at a particular part of the process, the automated system will interlock the necessary steps of the process. The system may automatically recover (e.g. by pH

correction dosing) and recommence operation or may require the water to be sent back to the head of the system for re-treating which can be facilitated by manually running pumps and opening/closing actuated valves.
pH, Turbidity and EC are monitored at the Treated Water to ensure that the water remains within the Discharge Criteria. pH and ORP are measured throughout the process to ensure that the treatment processes are operating at their optimum design requirements to remove the target contaminants.

Alarms and emails are also sent out to operators and managers to notify them of plant issues. If the operator is onsite, they will investigate the cause of the alarm immediately. If the operator is not present at site or the incident occurs outside of normal operation hours, then the operator will attempt to fix the problem remotely. If this is not possible then the operator will assess the urgency of the situation and attend site if necessary to rectify the issue. Enviropacific maintain a team with personnel on-call for these requirements.

If sample results of treated water indicate a failure, Enviropacific will notify the client via email and phone call and still follow the steps of ITR-06 to ensure that normal processes are followed and that relevant documentation is available for record keeping.

By implementing the batch treatment process, the likelihood of a treated water environmental breach occurring is significantly reduced.

4.5 Record keeping

The following is a list of documents which will be kept and recorded. Please not that this may be paper records or live excel documents. Either form will be occasionally backed up to Enviropacific servers.

Description	Frequency
ITP-06 – Operation of the TWTP & Discharge of Treated Leachate	Daily operation and completion prior to any discharge of treated leachate from Treated Water Tanks
NATA Accredited Laboratory Results	Prior to any discharge of treated Leachate from the Treated Water Tanks. To be submitted as part of ITP-06
Daily operator check sheet	While the plant is running
Maintenance Schedule log sheet	Check when attending site, sign completed items.

Additionally, TWTP operational data (flow, pH, level, operational status etc.) will be available live at all times via remote login and can be compiled and recorded for submission to HAKK at the nominated frequency to maintain any compliance requirements.

4.6 Enviropacific Contact List

Contacts, roles, responsibilities and training		
Name	**Title**	**Roles and responsibilities**
Patrick Puddefoot (Enviropacific) patrick.puddefoot@enviropacific.com.au	Project Manager & Lead Commissioning Engineer	Approval of design plans, inspection test plans, inspection test records, maintenance schedules, commissioning of the system. Stakeholder liaison including submission of weekly/monthly reports.
Chris Dogulin (Enviropacific)	Project Director	Stakeholder liaison
John Phipps (Enviropacific)	Engineering Manager	Management and approval of all design processes
Michael Stark (Enviropacific)	Lead Process Engineer	Design of the process and equipment selection for the water treatment plant
Peter Manning (Enviropacific)	Project Engineer & Draftsman	Creation of site documentation including inspection test plans, inspection test records. Design and installation of the water treatment plant. WTP troubleshooting, guidance and change management as necessary.
Dave Chisolm (Enviropacific) 0419 182 191 Karl Schwizler (Enviropacific) 0499 501 988	Operators	Day to day operation and maintenance of the TWTP. Testing and record keeping. Reporting to PE/PM
On call / After Hours Contact: 0409 797 404	On-call operator	Responds to after hours plant alarms and issues. Will attend site after hours if deemed necessary

5 Decommissioning of the TWTP

5.1 Timeline

The TWTP is expected to be operational on site for 3 years until early 2025. If leachate generation at the site is greatly reduced during this time, the TWTP may be decommissioned sooner.

5.2 By-Product Management & Disposal

At the time of decommissioning the TWTP will be operated to treat as much of the remaining leachate as possible. At the end of treatment the TWTP will be flushed with potable water to remove the remaining leachate left within the equipment and pipe systems of the plant.
After the system has been flushed and cleaned with potable water, the filter media will be removed from the filters. This media and resin waste product will be removed from the filter and will be classified, collected, and disposed offsite in a licenced facility.

5.3 Roles and Responsibilities

The below provides a breakdown of the Decommissioning team structure, roles, and responsibilities.

Table 5: Roles and Responsibilities

Role	Responsibility	Duties
Project Manager Patrick Puddefoot	Overall responsibility for project deliverables Oversee all works and provide assistance and sign off when required	Ensure all decommissioning activities run to schedule Facilitate hand over to Daracon General oversight and planning of decommissioning and testing activities and progress
Safety Coordinator Fola Ladiran	Review work procedures and safe work method statements (SWMS) such that they comply with Enviropacific Safety Procedures	Develop safety documentation Ensuring all involved in decommissioning are inducted and signed on to the SWMS Ensure that decommissioning work complies with relevant safety standards and guidelines Ensure that all work procedures are followed, and work carried out according to SWMS
Site Supervisor James Bowden	Oversee all works and provide technical assistance and sign off when required. Supervise and direct staff	Supervise works and co-ordinate Sub-Contractors Address engineering deficiencies and punch list activities and close out Participate in all coordination, scheduling, safety and progress review meetings

6 Appendices

1. Inspection Test Plans
2. Inspection Test Reports
3. EPA Consultation

INSPECTION AND TEST PLAN 01

ENVIROPACIFIC SERVICES

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Formwork and slab	**Contract No/Ref:**	**ITP No.** 01	**Rev No.** A
Site Location for inspection/testing: Kurri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date:** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	
EPS Representative:		**Client:**	

ID #	Process Step	Responsibility	Stage	State Acceptance Criteria	Records of Inspection or Test (s)	Inspection/Test Responsibility		Date Inspected*	Comments or NCR
1.	Clear area	Daracon		Area for formwork is cleared and delineated					
2.	Identify underground services	Daracon		Ensure any underground services are identified and plans are made to avoid them					
3.	Formworking	Daracon		All formwork is completed per specifications/design					

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: A = Approve; T = Test; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; S = Submit; PM = Project Manager; SM = Site Manager; DM = Design Manager, EPS = Enviropacific; C = Consultant responsibility to EPS; NCR = Non-conformance; S. Con = Subcontractor

ID #	Process Step	Responsibility	Stage	State Acceptance Criteria	Records of Inspection or Test (s)	Inspection/Test Responsibility		Date Inspected*	Comments or NCR
4.	Pouring of slab/concrete bund	Daracon		Slab is poured, level/graded with concrete bund walls meeting design requirements					
5.	Allow to slab to set and check for deficiencies	Daracon		Slab is well set and has no deformities/deficiencies					

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: A = Approve; T = Test; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; S = Submit; PM = Project Manager; SM = Site Manager; DM = Design Manager, EPS = Enviropacific; C = Consultant responsibility to EPS; NCR = Non-conformance; S. Con = Subcontractor

AMENDMENTS			
No.	**Description of amendment made**	**Date**	**Approved by PM (sign)**

PERSONNEL COMPLETING THIS ITP				
No	**EPS Rep Name**	**Date**	**Position**	**Signature**

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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INSPECTION AND TEST PLAN Q-02-01

ENVIROPACIFIC

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Pre- Commissioning/ Installation	**Contract No/Ref:**	**ITP No.** 02	**Rev No.** A
Site Location for inspection/testing: Kurri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date:** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility (Signature)			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client		
1.	Access and inspection of slab area	Prior to Delivery	Access is suitable. Slab matches civil IFC drawings	- Visual inspection - dimensional checks - QA complete	- ITP 02 - ITP 01		V, D, H	V, D		
2.	Delivery / set- out of major equipment	After Delivery	Equipment set out as per General Layout DWG or as agreed on- site changes	- Visual inspection - dimensional checks	- ITP 02		V, D			
3.	Material Inspection - Pipework - Pumps/Skids - Process tanks - Instruments	Upon Delivery	Materials are as ordered, are not damage, are fit for use	Inspect materials for correctness and damage	- Delivery Dockets - ITP 02 - Photo's - ITR-02-01	X	V, D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility (Signature)			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client		
4.	General completion of plumbing installation	After Bulk Installation	Plumbing has been completed as per Piping and Instrumentation Diagram	- Compare plumbing installation against P&ID. - Verify supports are adequate - Check all fasteners are secure	- Delivery Dockets - ITP 02 - ITR-02-01	X	V, D			
5.	Flush and Fill	After Plumbing Installation	- Pipe/equipment adequately supported. - Exclusion zones established. - Bulk of swarf and debris removed. - Air removed from system.	- Check workers understand and have signed SWMS. - Inspect pipe and equipment. - Establish exclusion zone. - Mechanically remove debris. - Open air- bleed points. - Flush swarf from system. - Fill with water. - Close air- bleed points.	- ITR-02-02	X	D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility (Signature)			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client		
6.	Pressure Test	Each test section	- Pressure test system connected. - Appropriate test pressure gauge installed. - Test section passes pressure test. - Any leaks rectified. - Pressure test in accordance with AS/NZS 3500.1:2015 Plumbing and drainage Water service - Release pressure, remove equipment, store safetly	- Follow ITR-02-03	- ITR-02-03	X	D	W		LOR must be notified of the test periods and may spot-check any test they see fit. Works will be documented and continue whether or not a witness is provided.
7.	Load media into filter beds	After pressure testing	Correct media loaded into their corresponding vessels	- Follow SWMS for media loading procedures. - follow media loading schedule for each filter type.						
8.	General Completion of Electrical Installation	After Bulk Install	Electrical installation in accordance to Wiring Rules AS/NZS 3000- 2018, Electrical Installations AS/NZS 3012:2010 & as per electrical schematic drawings.	Compare electrical installation against electrical schematic drawings. Obtain Certificate of Compliance for Electrical Work	- ITP-02 - CCEW	D	D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility (Signature)			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client		
9.	Installation completed	After bulk mechanical & electrical installation.	All installation tasks completed		ITP Q-02-01 Electrical contractor ITR	H Electrical Supervisor	H Commissioning Manager	H Senior Package Engineer		*(Some pressure testing/rectification is typically outstanding at this stage and can be listed in the amendments below once considering risks and additional hold points placed on subsequent ITP's)*

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant

AMENDMENTS			
No.	**Description of amendment made**	**Date**	**Approved by PM (sign) &SPE (LOR)**

PERSONNEL COMPLETING THIS ITP				
No	**EPS Rep Name**	**Date**	**Position**	**Signature**

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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INSPECTION AND TEST PLAN ITP 03

ENVIROPACIFIC

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Dry Commissioning	**Contract No/Ref:**	**ITP No.** 03	**Rev No.** A
Site Location for inspection/testing: Kuri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client (LOR SPE)		
1.	General Site Safety	At the beginning of Dry Commissioning	- Completion of ITR 03-01. - Area is clear, hazards are controlled and identified, emergency exits are clear	Visual inspection	ITR 03-01		D			
2.	MCC Sub Circuits and Labelling	After Electrical Installation	-Completion of ITR 03-02 -Wiring and components installed as per Wiring Rules AS3000-2018 & Electrical Installations AS/NZS 3012:2018 & as per electrical schematic drawings - Submit Electrical Certificate of Compliance.	Visual and electrical inspection of all MCC components. Complete ITR-03-02	ITR 03-02 Electrical Certificate of Compliance	D (Electrician)	D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client (LOR SPE)		
3.	Drive motors with Direct Online Starters (DOL)	After Electrical Installation	-Completion of ITR 03-03 -Wiring and components installed as per Wiring Rules AS3000-2018 & Electrical Installations AS/NZS 3012:2018 & as per electrical schematic drawings -Submit Electrical Certificate of Compliance. -DOL motors installed correctly and functioning	Visual and electrical inspection of all MCC components. Settings and bump testing of DOL motors Complete ITR-03-03	ITR 03-03 Electrical Certificate of Compliance	D (Electrician)	D			
4.	Drive Motors with Variable Speed Drives	After Electrical Installation	-Completion of ITR 03-04 -Wiring and components installed as per Wiring Rules AS3000-2018 & Electrical Installations AS/NZS 3012:2018 & as per electrical schematic drawings - Submit Electrical Certificate of Compliance. -VSD driven motors installed correctly and functioning	Visual and electrical inspection of all MCC components. Settings and bump testing of VSD driven motors Complete ITR-03-04	ITR 03-04 Electrical Certificate of Compliance	D (Electrician)	D			
5.	Plant Control System	After Electrical Installation	-Completion of ITR 03-05 -Wiring and components installed as per Wiring Rules AS3000-2018 & Electrical Installations AS/NZS 3012:2018 & as per electrical schematic drawings - Submit Electrical Certificate of Compliance. -control systems installed correctly and functioning	Visual and electrical inspection of all MCC components. Settings and bump testing of VSD driven motors Complete ITR-03-05	ITR 03-05 Electrical Certificate of Compliance	D (Electrician)	D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client (LOR SPE)		
6.	Tanks (including all process water, chemical, reaction/mixed tanks)	After Mechanical Installation	-Completion of ITR 03-06 -Installation completed as per P&ID -Tank, valves and instruments are appropriately installed and functioning.	Visual, electrical, and mechanical inspection of tanks. Complete ITR-03-06	ITR 03-06		D			
7.	Process Pumps	After Mechanical Installation	-Completion of ITR 03-07 -Installation completed as per P&ID -Pump installed, protected, labelled, checked -All valves and instruments are appropriately installed and functioning	Visual, electrical, and mechanical inspection Complete ITR-03-07	ITR 03-07		D			
	Filter Press	After Mechanical Installation	-Completion of ITR 03-08 -Installation completed as per PID -Press has been installed level -Services and instruments fitted and functioning -Emergency stop lanyards functioning correctly -Mechanical guards in place	Visual, electrical and mechanical inspection Complete ITR-03-08	ITR 03-08		D			No Filter press on this project

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client (LOR SPE)		
8.	Filters	After Mechanical Installation	-Completion of ITR 03-09 -Installation completed as per P&ID -Filter filled with correct media type -Vessel sizings appropriate, distributors fitted and in good condition	Visual, electrical, and mechanical inspection Complete ITR-03-09	ITR 03-09		D			No filters in this project
9.	Chemical storage and dosing systems	After Mechanical Installation	-Completion of ITR 03-10 -Installation completed as per P&ID -Tank storage, level indication, fill point connection and bunding appropriate -Dosing pumps fitted and functioning -Chemical lines installed appropriately and mechanically protected	Visual, electrical and mechanical inspection Complete ITR-03-10	ITR 03-10		D			
10.	Air Compressors	After Mechanical Installation	-Completion of ITR 03-11 -Installation completed as per P&ID -External 3rd party commissioning documentation	Visual, electrical, and mechanical inspection ancillary items Complete ITR-03-11	ITR 03-11 External Commiss. Report	D	D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Work Group	Enviropacific (PE/PM)	Client (LOR SPE)		
11.	Ancillary Items (Safety shower, sump, potable manifold, air manifold)	After Mechanical Installation	-Completion of ITR 03-12 -Installation completed as per P&ID -Sump sufficient - Service water sufficient - Eyewash/Safety Showers shall be connected to potable water in accordance with AS 4775	Visual, electrical, and mechanical inspection ancillary items Complete ITR-03-12	ITR 03-12		D			
12.	Dry Commissioning completed	After Dry Commissioning	All Dry Commissioning tasks completed, and action items closed out.		ITP 03		H Commissioning Manager	H Senior Package Engineer		

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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AMENDMENTS			
No.	**Description of amendment made**	**Date**	**Approved by PM (sign)**

PERSONNEL COMPLETING THIS ITP				
No	**Name**	**Date**	**Position**	**Signature**

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INSPECTION AND TEST PLAN ITP 04

ENVIROPACIFIC

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Wet Commissioning	**Contract No/Ref:**	**ITP No.** 04	**Rev No.** A
Site Location for inspection/testing: Kurri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date:** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
1.	HMI Set and Test	Start of Wet Commissioning	- Setpoints entered on HMI as per functional description -Alarms and errors are cleared as best possible.	- Set values	ITP-04 ITR-04-01		D			
2.	Check Digital Inputs/Outputs	During Wet Commissioning	- Manually test all on/off input/output actions are correctly paired from controls to field as per electrical Schematics drawings.	- Test actions	ITP-04 ITR-04-01		D			
3.	Check Analogue Inputs/Outputs	During Wet Commissioning	-Set-up field instrument ranges, scale analogue signals to PLC as per functional description	-Set up instruments and pair to PLC	ITP-04 ITR-04-01		D			
4.	Test faults & interlocks	During Wet Commissioning	- Manually test all faults are triggered on HMI and shutdowns are appropriate as per functional description. - Check control setpoints trigger correctly in auto sequences - delays are appropriate	-Test actions -Turn to auto and manipulate variables	ITP-04 ITR-04-01		D			
5.	Check SMS Functionality	During Wet Commissioning	- Simcard installed and operational. - Verify SMS alerts received	-Observe and record	ITP-04 ITR-04-01		D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
6.	Simulate Startup after Power Failure	During Wet Commissioning	- System can be restarted by operator as per functional description	-Shutdown system and restart	ITP-04 ITR-04-01		D			
7.	Wet Commissioning completed	After Wet Commissioning	All Wet Commissioning tasks completed and action items closed out		ITP-04 ITR-04-01		H Commissioning Manager	H PM / Package Engineer		

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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AMENDMENTS			
No.	**Description of amendment made**	**Date**	**Approved by PM (sign)**

PERSONNEL COMPLETING THIS ITP				
No	**EPS Rep Name**	**Date**	**Position**	**Signature**

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INSPECTION AND TEST PLAN 05

ENVIROPACIFIC

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Process Commissioning	**Contract No/Ref:**	**ITP No.** 05	**Rev No.** A
Site Location for inspection/testing: Kurri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date:** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
1.	Prepare Chemical Tanks for filling	Prior to handling chemicals	- Tanks drained of water after wet commissioning. - Filling in accordance to AS 3780- 2008 The storage and handling of corrosive substance & NSW Dangerous Goods Code of Practice 2005	- Drain and check tanks are empty. - Correct PPE is worn. - Spill kit available	ITP 05 ITR 05-01		D			
2.	Fill Chemical Tanks	Prior to Process Commissioning	- Piping is connected in a way to avoid leaking of chemicals - Tanks filled with Chemicals	- Inspect piping and connections prior to dispensing chemicals. - Fill with chemicals.	ITP 05 ITR 05-01		D			
3.	Provide Raw Water Feed to the WTP	Prior to Process Commissioning	- Sample raw water for analysis of inlet parameters	- Water analysis by NATA accredited lab	ITP 05 ITR 05-01		D			
4.	Determine the inlet pH dosing control settings	During Process Commissioning	- Dose rate established and set.	- Run raw water through WTP. - Tune to achieve desired pH.	ITP 05 ITR 05-01		D			
5.	Determine Coagulant/Polymer Dose Rate settings	During Process Commissioning	- Coagulant dose rate established and set. - Polymer dose rate established and set.	- Sample influent. - Conduct jar test to determine dose rate.	ITP 05 ITR 05-01		D			

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ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
6.	Determine ISR sludge discharge settings	During Process Commissioning	-Discharge times and frequency etablsihed and set -Ensure clarifier performance is not compromised	-Adjust discharge time and rate -Conduct sampling of overflows and sludge pump outlets	ITP 05 ITR 05-01		D			
7.	Determine Filters Backwash Settings	During Process Commissioning	- Filtration and backwash operates effectively.	- Observe filtration to determine backwash intervals. - Observe complete backwash sequence and adjust as necessary.	ITP 05 ITR 05-01		D			
8.	Determine polymer make down system settings for Pipe Flocculator	During Process Commissioning	-Confirm dilution is 0.1-1% -Satisfy dilute polymer pumps are operating inside their pumping range	-Adjust dilution water inlet rate and neat polymer pump rrate -Measure dilution rate	ITP 05 ITR 05-01		D			
9.	Record all commissioning setpoints	After Process Commissioning	- All setpoints recorded	Inspect final state and record	ITP 05 ITR 05-01		D			
10.	Determine Discharge System Set points Sample and Report on Discharge Water Quality	During Process Commissioning	- Treated water parameter meet discharge limits.	Sample and test to ensure discharge criteria is met before any water is discharged Record results	ITP 05 ITR 05-01		D			

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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INSPECTION AND TEST PLAN 05

ENVIROPACIFIC

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
11.	Process Commissioning completed	After Process Commissioning	All Process Commissioning tasks completed and action items closed out		ITP 05 ITR 05-01		H Commissioning Manager	H PM / Package Engineer		

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Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant responsibility to EPS

AMENDMENTS			
No.	Description of amendment made	Date	Approved by PM (sign)

PERSONNEL COMPLETING THIS ITP				
No	EPS Rep Name	Date	Position	Signature

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

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INSPECTION AND TEST PLAN 06

ENVIROPACIFIC

Project title: HAKK TWTP		**Project No:** 105079	
Description of activity: Operation of TWTP - Discharge of Treated Leachate	**Contract No/Ref:**	**ITP No.** 06	**Rev No.** A
Site Location for inspection/testing: Kurri Kurri, NSW		**Lot No:**	
ITP prepared by: Fahad Saleem **Date:** 29/09/2021		**ITP approved by:** Patrick Puddefoot **Date:**	

ID #	Process Step	Stage / Frequency	State Quality Acceptance Criteria:	Inspection Test Procedure	Records of Inspection or Test (s)	Inspection/Test Responsibility			Date Inspected*	Comments or NCR
						Worker	Enviropacific (PE/PM)	Client		
1.	Provide Raw Water Feed to the TWTP	Start up of system at start of day			ITP 06 ITR 06-01		D			
2.	Sample raw leachate	During Operation of the TWTP	Raw Leachate is within the Influent Design Criteria	- Water analysis by NATA accredited lab	ITP 06 ITR 06-01		D			
3.	Operate the TWTP until a Treated Water Tank is at capacity	During Operation of the TWTP		Level measurement shown at the HMI	ITP 06 ITR 06-01		D			System can still operate and fill another Treated Water Tank while the water from one of the tanks is being analysed
4.	Sample the full Treated Water Tank and Report the water analysis	During Process Commissioning	- Treated water parameter meet discharge limits.	Sample and test to ensure discharge criteria is met before any water is discharged Record results	ITP 06 ITR 06-01		D, H	R		Hold Point for EPS. Report results of treated leachate to client for review prior to discharge to the environment.

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant responsibility to EPS

AMENDMENTS			
No.	**Description of amendment made**	**Date**	**Approved by PM (sign)**

PERSONNEL COMPLETING THIS ITP				
No	**EPS Rep Name**	**Date**	**Position**	**Signature**

Records of Inspection or Test Legend: List Inspection and Test Report Type. * For activities with multiple frequencies write date of initial inspection. Those Items requiring multiple inspections should be documented on a separate ITR.

Inspection/Test Responsibility Legend: X = Worker or workgroup self-inspection; H = Hold Point; D = Document; R = Review; V = Visual; W = Witness; C = Consultant responsibility to EPS

ENVIROPACIFIC SERVICES PTY LTD
INSPECTION AND TEST RECORD ITR-02-01
General Completion of Plumbing Install

Project Title: HAKK TWTP		**Project No:** 105079
Location: Kurri Kurri, NSW		**ITR Rev:** A
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**
ITP completed by:		**Date:**

Step	Step No.	Acceptance Criteria	Conformation	Comment / Initial
Preliminary	**1.1**	Licence / up to date qualifications available	Yes/No/NA	
	1.2	PID and General Arrangement Layout available	Yes/No/NA	
	1.3	Materials are suitable for the installation and no damages No foreign materials, flora or fauna in the pipe	Yes/No/NA	
Pumps, Tanks and Equipment	**2.1**	Orientation of equipment is correct with connections typically at 90 or 45 degree placements	Yes/No/NA	
	2.2	Positioning allows for: - 600mm walkways - 2200mm headroom - sufficient access to manways - space for pipe-racks outside of walkways	Yes/No/NA	
	2.3	Equipment is bolted down - Stainless studs chemset into floor surfaces - Stainless or HDG into raised surfaces - Nylon isolation washers used for dissimilar metals	Yes/No/NA	
Piping installation	**3.1**	Check P&ID, GA and Pick List, discuss each pipe run with project engineer before commencing	Yes/No/NA	
	3.2	Consider the operation of the equipment being installed (vents, access points, travel of moving parts, rain/sun)	Yes/No/NA	
	3.3	Consider operator pathways and work areas. Reach to valves or controls.	Yes/No/NA	
	3.4	Consider the ability to remove equipment/instruments (E.g. flanges and unions)	Yes/No/NA	
	3.5	Consider spacing: - between pipes for flange diameter - >5 Diameters before flow meters >2D after - provision for future cut-in / repairs	Yes/No/NA	
	3.6	Pipe supports at no greater than 1.5m spacing	Yes/No/NA	

	3.7	Ensure cut supports and all metal cuts are appropriately passivated (E.g. Cold Gal)	Yes/No/NA	
	3.8	Swarf removed from each pipe cut.	Yes/No/NA	
	3.9	Correct clear Primer and Glue is available, sealed, new and free from water ingress.	Yes/No/NA	
	3.10	Joins are glued to full fitting depth (twisted and held), evidence of glue around the full joint circumference is present. Joins are not glued in the rain / on wet surfaces.	Yes/No/NA	
	3.11	Ensure no glue enters the valve (glue sockets and flanges before installing the valve)	Yes/No/NA	
	3.12	Final pipe installation is parallel with minimised bends & fittings.	Yes/No/NA	
	3.13	Threads are scratched before applying PTFE tape (Pink) and paste (Loctite 567). No evidence of thread slippage during installation.	Yes/No/NA	
	3.14	Flange bolts are tightened in a rotating star pattern to prevent gasket bunching. All bolt holes on flanges are used.	Yes/No/NA	
	3.15	Bolts on lugged valves do not 'bottom-out' (touch in the centre when fully tightened)	Yes/No/NA	
Chemical Systems	**4.1**	Adhere to or seek advice: Sulphuric Acid 51% – Viton seals Hypochlorite 12.5% – Viton seals Sodium Hydroxide 30% – EPDM seals Aluminium Chlorohydrate 23% – EPDM seals Soda Ash 5% – EPDM seals Sodium Metabisulphite – EPDM seals Polymers – EPDM seals (Viton if >2 year duty)	Yes/No/NA	
	4.2	Safety showers <7m from chemical dosing systems. In direct line of site without obstruction. Fed by >1.25" pipe. Take-off is before any RPZ device. If in direct sunlight: Lagged or thermal valve installed.	Yes/No/NA	
	4.3	For corrosive chemicals: - Pipe/Tubing is double contained - Splash-screens are installed where double containment is not possible & around dosing points - Flushing systems installed as per the P&ID	Yes/No/NA	
Instrument Installation	**5.1**	- Tee's for gauges are on top of pipes - No instrument should be facing down (silt ingress/blockage)		

		- Samples are on the side of pipes (representative)		
	5.2	pH probes must be vertical only		
	5.3	Consider if the instrument must be within the flow path (flow switch, pH probe, dosing quills…)		
	5.4	Install a cover for added protection of rain & UV damage to digital screens.		
	5.5	Flow meters must be in horizontal or vertical (up) flow. Ground-rings installed. Minimum 5D spacing upstream, 2D spacing downstream. Never in pump suction lines.		
Hold Point		Installation Complete and satisfactory?	Yes/No	

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT ITR-02-02
Pre-Commissioning Flushing and Filling

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Setup	SWMS read and understood by all workers		SWMS No. _____	Yes/No	
	Pipes inspected for damage	Are any of the pipes damaged? Rectify if damaged		Yes/No	
	For each section of pipe and equipment to be flushed and filled, **allocate an ID number** and mark up on a P&ID		Test Record Below		
	Each section of pipe and equipment **is adequately supported** to avoid excess movement and support the weight of additional water	Are all sections of pipe and equipment appropriately supported?	Test Record Below	Yes/No	
	2m Exclusion zones set up or as appropriate	What is the control? COMMENT		Yes/No	
Flushing	For each section of pipe and equipment, **remove the bulk of swarf/debris** mechanically prior to filling	What is the method? COMMENT	Test Record Below	Yes/No	
	For each section of pipe and equipment, **open air-bleed points** as necessary to removal all air from system		Test Record Below	Yes/No	
	For each section of pipe and equipment, fill with water via sample points or pressure gauge isolation valves, then **flush such that swarf is removed** from system	What is the method? COMMENT	Test Record Below	Yes/No	
Filling	For each section of pipe and equipment, completely fill with water via sample points or pressure gauge isolation valves then close air-bleed points and valves around the section	Have all valves and seals been checked?	Test Record Below	Yes/No	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT ITR-02-02
Pre-Commissioning Flushing and Filling

Step	Action	Item	Reference	Confirmation	Initial/Sign
Hold Point	Ready for pressure test?			Yes/No	

COMMENTS

Cleaning Test Record

ID	Description (Air-bleed/Valve)	Section Physically Supported	Mechanical Clean Completed	Opened to allow air to bleed	Water Flush Completed	Closed off

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT ITR-02-03
Pre-Commissioning Pressure Test

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Setup	SWMS read and understood by all workers		SWMS No. _____	Yes/No	
	For each section of pipe and equipment to be pressure tested, allocate an **ID number and mark up on a P&ID**. It is recommended to use the same IDs as per ITR 02-02 Flushing and Filling		Test Record Below		
	For each section of pipe and equipment, to be pressure tested, pressurise via sample points or pressure gauge isolation valves	Connect to pressure test bucket		Yes/No	
		Ensure an isolation valve is between the system and test bucket		Yes/No	
		Ensure an appropriate test pressure gauge is installed	Pressure gauge capacity _____	Yes/No	
Pressure Test – Consult Pressure Reference Table Below	For each section of pipe and equipment pressurise to 50% of test pressure	Leaks detected?	Test Record Below	Yes/No	
		Rectification COMMENT		Yes/No	
	Release Pressure For each section of pipe and equipment follow SWMS and safely release pressure via an appropriate	Leaks detected?	Test Record Below	Yes/No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
	sample valve or pressure gauge isolation valve	SWMS read and understood by all workers	SWMS No. _____	Yes/No	
Release Pressure	Remove temporary blinds / test equipment Open valves as appropriate for safe storage. Note: Avoid draining or allowing air ingress into the system where possible.			Yes/No	
				Yes/No	
	Water used for pressure testing to remain in pipes and vessels until Process Commissioning stage.			Yes/No	
	Hold Point	Ready for Operation?		Yes/No	

COMMENTS

Pressure Reference Table		
Section	**Max Test Pressure**	**Min Duration**
Note: An initial air pressure test of <10kPa can be conducted to determine major leaks. Higher pressure is not permitted due to risk of projectiles with PVC pipe.	<10 kPa	N/A

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT ITR-02-03
Pre-Commissioning Pressure Test

Pressure Test Record							
ID	**Section**	**Start Time**	**End Time**	**Start Pressure**	**End Pressure**	**Pass / Fail / Comment**	**Initial**
Commissioning Manager Signoff:						**Date:**	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-01
General Site Safety

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Bunded Area of TWTP				
Step	**Action**	**Item**	**Reference**	**Confirmation**
General Site Safety	No slip, trip & fall hazards existing			Yes / No
	Adequate lighting is available during the day and night			Yes / No
	Accessibility for inspection/maintenance of equipment is adequate and reasonably practicable			Yes / No
	Warning signs / labelling available to warn of hazards (confined space, hot surface, electrical, rotating parts, corrosive etc.)			Yes / No
	Emergency escape route/s are clear			Yes / No

Treated Water Tanks Area				
Step	**Action**	**Item**	**Reference**	**Confirmation**
General Site Safety	No slip, trip & fall hazards existing			Yes / No
	Adequate lighting is available during the day and night			Yes / No
	Accessibility for inspection/maintenance of equipment is adequate and reasonably practicable			Yes / No
	Warning signs / labelling available to warn of hazards (confined space, hot surface, electrical, rotating parts, corrosive etc.)			Yes / No
	Emergency escape route/s are clear			Yes / No

	Hold Point	Ready for Operation?		Yes / No

COMMENTS

Action Required

Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project

Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion

ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-02
Dry Commissioning MCC Sub Circuits and Cables

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Check MCC cabinets, ventilation, and sealing	Check the cabinets for cleanliness (vacuumed, cleaned and dirt removed). All tools, scrap wire and other debris removed.			Yes / No	
	Check that fans used for forced air cooling have: a. Shafts that rotate freely b. Blades with no dust or debris build-up			Yes / No	
	The bottom openings of the MCC container for incoming cables from the field are properly sealed			Yes / No	
	Verify vents are free from obstructions			Yes / No	
	Check that the cabinet is free of any non-superficial rust			Yes / No	
	Check that all filters are in place and clean			Yes / No	
Check Protective Earthing (PE)	Check and verify earthing continuity from main earth link to field equipment, record results.		Highest resistance _____ohms	Yes / No	
Check wiring and sub circuit components	Check termination schedule connections as per schematic diagrams and labelled accordingly		Drawing No.	Yes / No	
	Check cable polarities, cable sizes and cable types against drawings		Wiring rules AS3000 AS3012	Yes / No	
	Check all terminals for proper connections			Yes / No	
	Check for proper fuse ratings of all control circuits using drawings and schematic diagrams		Drawing No. _____	Yes / No	
	Check all switches and pushbuttons for completeness of movement, installation, adjustment, rating and labelling			Yes / No	
	Check for proper segregation of wires			Yes / No	
	Check instrumentation cable earthing			Yes / No	
	Visually inspect accessible cables to		AS3000	Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
	confirm insulation integrity and that the cable route and separation between power and control cables are in accordance with the wiring rules		AS3012		
	Perform the following for field wiring: a. Check the field wiring for proper conductor size selection b. Verify all incoming and outgoing power wiring is secure, well supported, and braced to withstand the effects of a fault current Check the terminations/connections at field junction boxes		Conductor Size _____	Yes / No	
Check uninterrupted power supply (UPS)/Battery	The area around the UPS/battery is clean and dust free			Yes / No	
	A main earth conductor is installed			Yes / No	
	Check proper cable terminations according to wiring diagrams and UPS/battery installation manual			Yes / No	
	Check polarity of the batteries connected externally			Yes / No	
Check the earthing system	The earthing system checked to ensure that all parts of steel structures, motor frames, switchgear, trays, conduits and other electrical equipment are earthed in accordance with the drawings and the relevant standards		AS3000 AS3012	Yes / No	
	Check that all connections to the main earth are clearly identified			Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
	Check that the Control and instrument earthing systems are adequate and effectively separated			Yes / No	
	Check the earthing connection of the UPS/battery system			Yes / No	
	Check for proper sealing of conduit connections, cable glands and other penetrations			Yes / No	
	Check that all spare conductors are identified and insulated, and/or laced back with sufficient length in the duct			Yes / No	
	Check spare components and /or drawings that are required to be left in the enclosures			Yes / No	
	Make sure that enclosures are equipped with drain and breather fittings if required, and inspect all boxes for any moisture collection			Yes / No	
	Check for the correct settings of switchgears and other protection schemes (MCCB, MPCB, ELR etc.)			Yes / No	
Check each starter module in MCC	Check alignment and operation of main isolating switches and correct adjustment where necessary			Yes / No	
	Check thermal overloads and fuses, if used, for size and rating		Size / Rating _____	Yes / No	
	Check tightness of all connections and particularly connections to the thermal overloads			Yes / No	
	Check motor overload rating and thermistor operating resistance. Set all protection relays in accordance with drawings. Set motor overload to motor full load current, set MPCB, MCCB settings appropriately			Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
	Check continuity of control system wiring and check tripping functions			Yes / No	
	Open the DC fuse holders and check the 24v supply is correct prior to energizing instruments			Yes / No	
	Carry out continuity and IR test on all motor starters			Yes / No	
	Operate the starter for proper operation from the HMI			Yes / No	
	Confirm all loads are connected to the correct starter			Yes / No	
	Ensure that the screen of cables run from a VSD to a motor is positively earthed at both the motor and the VSD to prevent radiation of electromagnetic energy			Yes / No	
	Hold Point	Ready for Operation?		Yes / No	

COMMENTS
Action Required
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion

ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-03
Dry Commissioning Motors (Direct Online Starters)

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item		Reference	Confirmation (Y/N/NA)	Initial/Sign
1.0	Check the motor terminal boxes for proper sealing and gland tightness					
2.0	Check the wiring with the wiring diagram and terminations at the starter; ensure cable size is correct					
3.0	Check the incoming voltage, started and overload					
4.0	Check the direction of rotation					
5.0	Check the overload relay is set for the motor rated current and coil voltage is correct					

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-03
Dry Commissioning Motors (Direct Online Starters)

Step	Action	Item		Reference	Confirmation (Y/N/NA)	Initial/Sign
6.0	Check the motor operation locally and remotely from the PLC					
7.0	Check current and vibration of each motor					
	Hold Point	Ready for Operation?				

COMMENTS

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-03
Dry Commissioning Motors (Direct Online Starters)

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Drive/Pump/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC SERVICES PTY LTD
INSPECTION AND TEST REPORT 03-04
Dry Commissioning Drive Motors (Variable Speed Drives)

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurii Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item		Reference	Confirm. (Y/N/NA)	Initial /Sign
Check the motor terminal boxes for proper sealing	Check and confirm the sealing of motor terminal boxes and availability and tightness of cable glands					
Check VSD's and cabling	Check the VSD's and motors have been correctly installed and meet the wiring and safety standards			Standard		
	Check the power and motor cables are correctly sized, installed and terminated as per specifications and wiring diagram			Drawing		
Check cabling of all motors	All power cable shields have been correctly earthed at both ends, to the protective					

Step	Action	Item		Reference	Confirm. (Y/N/NA)	Initial /Sign
	earthing terminal at the inverter, at the motor and at the MCC					
	All control cable shields have been correctly earthed at one end only, preferably at the process control system end	Cable shields earthed correctly?				
		Any not connected to process control system end? Comment				
	The control cables have been installed according to the control system design			Drawing		
Check VSD quick set-up parameters	Check Quick Setup Parameters for all VSD's as per **Table 1** below					
	Check the connections to the cooling fan to ensure that the correct tap on the transformer has been selected in all VSD's					

Step	Action	Item		Reference	Confirm. (Y/N/NA)	Initial /Sign
Motor rotation and acceptance test	Check equipment manuals before doing rotation tests. Start each VSD to check the correct direction of rotation if possible, otherwise jog the motor to confirm the direction of rotation			Direction of Rotation		
	Follow the motor identification and auto tuning routines in VSD to get the maximum control and performance of the motor			**Table 1**		
	Check Speed, current (no load starting) and vibration of each motor as per the above sequence at different speeds according to the number of poles			**Table 1**		
	Check motor operation locally (from operator panel of VSD) and remotely (from PLC)					

Step	Action	Item		Reference	Confirm. (Y/N/NA)	Initial /Sign
	Scale the analog input/speed reference and scale analog outputs to get the values of properly assigned parameters correctly (ex: current, speed)			**Table 1**		
	Hold Point	Ready for Operation?				

TABLE 1					
Parameter	**Setting**				
Motor Power	[kW]				
Motor Voltage	[V]				
Motor Frequency	[Hz]				
Motor Current	[A]				
Motor Nominal Speed	[rpm]				
Minimum Reference	% of rpm				
Maximum Reference	% of rpm				
Ramp 1Ramp up Time	[sec]				
Ramp 1Ramp Down Time	[sec]				

TABLE 1 cont…					
Parameter	**Setting**				
Motor Power	[kW]				
Motor Voltage	[V]				
Motor Frequency	[Hz]				
Motor Current	[A]				
Motor Nominal Speed	[rpm]				
Minimum Reference	% of rpm				
Maximum Reference	% of rpm				
Ramp 1Ramp up Time	[sec]				
Ramp 1Ramp Down Time	[sec]				

ENVIROPACIFIC SERVICES PTY LTD
INSPECTION AND TEST REPORT 03-04
Dry Commissioning Drive Motors (Variable Speed Drives)

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-05
Dry Commissioning Plant Control System

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Check the P&ID and I/O schedule	Check all I/O's with I/O address schedule, control schematics and P&ID's to verify the loops and control cabling		Electrical schematics	Yes / No	
Conduct point to point checks from Remote MCC's to main MCC (terminal bar) and up to PLC	Check point to point while identifying the cables and ensure that they are labelled properly according to control schematics		Electrical schematics	Yes / No	
Visual inspection of PLC	Check to confirm all modules are fitted according to the reference diagrams and control schematic diagrams		Electrical schematics	Yes / No	
	Ensure that all Dual In-line Pin (DIP) mode select switches and configuration links on the chassis are correct			Yes / No	
	Ensure that all analogue modules are configured to operate on the designed protocol.		Electrical schematics	Yes / No	
	Check that all I/O modules have the correct part number as per the drawings			Yes / No	
	Confirm that any remote termination cable accessories are correctly fitted		Electrical schematics	Yes / No	
I/O checks on field devices	Check that all I/O cabling to field devices and the field devices themselves are installed and comply with the reference documents.		Electrical schematics	Yes / No	
	Verify that the supply to all field devices and I/O is isolated if required			Yes / No	
	Ensure adequate segregation of power and instrumentation cabling			Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
	Open all 24VDC fuses			Yes / No	
Power up PLC and I/O to verify output voltage	Switch on the AC power supply to the processor and I/O power supply modules and verify that the DC output voltages are correct.			Yes / No	
	Check that all power status indicators are correctly illuminated.			Yes / No	
	Check that the processor back up battery is fitted, healthy and that the battery age is within acceptable limits		Age and limits _____	Yes / No	
Load Program into PLC and check I/O s	(Re-confirm that there is no risk of accidental start-ups of equipment during program upload) Load the program into the processor and verify that all I/O can be correctly addressed and that no fault indicators are illuminated			Yes / No	
	Switch on the DC supply for digital output interposing relays. Force each output on individually and verify that: a. The indicating LED on the output module illuminates. b. The corresponding interposing relay is energised			Yes / No	
Check on communication links (TCP/IP)	Verify all communications between PLC and Computer, PLC and motor controller and PLC and operator interfaces			Yes / No	
	Switch on the DC supply to the input field devices and prove that each field device when operated: a. Illuminates the LED on the relevant digital input card b. Indicates the relevant state in the PLC data tables			Yes / No	
	Switch on the power supplies to the analog input devices and check the readings obtained			Yes / No	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-05
Dry Commissioning Plant Control System

Step	Action	Item	Reference	Confirmation	Initial/Sign
Calibration checks	Checks on calibration in both upscale and downscale directions are done (Check for analog channel scaling-lower and upper)			Yes / No	
Loop testing	Loop testing are carried out on each loop to ensure that all instrumentation components (as per P&ID) in the Loop are in full operational order when connected and are in a state ready for plant commissioning		Electrical schematics	Yes / No	
Interlock Testing	Check interlock testing with respect to the P&ID, Trip and Interlock List and Design Criteria (FAT)		WTP Functional Description	Yes / No	
Check for Emergency Safety Stops	Check for all Safety Emergency Stops			Yes / No	
Check for Machine Safety	Check process interlocks			Yes / No	
Alarm Management-testing	Check all alarm functions against the alarms list			Yes / No	
Check CPU Performance	Check the load level of the CPU of PLC			Yes / No	
Test Backups	Keep a backup of PLC program and the HMI		Backup Location _____	Yes / No	
Trend / Archiving	Check analogue signal trending / archiving with correct scaling, view history functions			Yes / No	
Check for OEM Licences	Check for OEM licences			Yes / No	
	Hold Point	Ready for Operation?		Yes / No	

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-06
Dry Commissioning Tanks

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Tank I.D. (✓, ×, N/A)			
Tanks - General	Piping and installation complete according to the P&ID (Walk through- highlight P&ID/as built)	Drawing No. _____	Drawing No. _____	Drawing No. _____	Drawing No. _____
	No damage or leaks				
	Check correct tank capacity (record capacity)	Capacity _____	Capacity _____	Capacity _____	Capacity _____
	Tank can be manually drained				
	All instruments/analysers are appropriately fitted and functioning?				
	Adjoining valves fitted and functioning				
	Overflow sufficient in size comparative to inlet pipework (Record size)	Size _____	Size _____	Size _____	Size _____
	Outlet piping allows for free-draining gravity flow without blockage				
	Tank is Vented or fitted with appropriate overpressure protection.				
	Inspection hatch is fitted and accessible				
	Sufficient room for maintenance activities				
Chemical Tanks	Bunding and separation distances are appropriate for the chemicals selected				

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-06
Dry Commissioning Tanks

Step	Action	Tank I.D. (✓, ×, N/A)			
Reaction/ Mixed Tanks	Check mixer nameplate against data sheets	Data Sheet _____	Data Sheet _____	Data Sheet _____	Data Sheet _____
	Mixer impellers located at correct height as per design specification and securely fastenned				
Polymer Make-down Unit	Protected against condensation and water Ingress into neat polymer / powder				
	Rotameter installed is of correct capacity	Capacity _____	Capacity _____	Capacity _____	Capacity _____
Additional					
	Hold Point				

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-07
Dry Commissioning Pumps

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	**Action**	**Pump I.D. (✓, ✗, N/A)**			
Pumps - General	Piping and installation complete according to the P&ID (Walk through- highlight P&ID/as built)	Drawing No. _____	Drawing No. _____	Drawing No. _____	Drawing No. _____
	Check each valve operation & handle access/path				
	Fasteners are tight and supports are adequate				
	Pressure rating of pipe/equipment is adequate for this duty				
	No damage or leaks				
	Check nameplate against data sheets	Data Sheet _____	Data Sheet _____	Data Sheet _____	Data Sheet _____
	Motor/pump is level and secure				
	Adequate free air circulation for motor cooling				
	Suction strainer adequate and maintainable				
	Pressure switch/transmitters appropriately fitted and functioning. (Record PIT-XXXX)				
	Flow switch/rotameters appropriately fitted and functioning. (Record FIT-XXXX)				
	Direction of check valves is correct				
	PRV set at _____kPa				

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-07
Dry Commissioning Pumps

Step	Action	Pump I.D. (✓, ✗, N/A)			
	Suction piping/tank is adequate				
	Upstream/downstream valves are open and pump IOM manual start procedures followed				
	Suction/Discharge pressure gauge range is appropriate. (Record Range).	Range _____	Range _____	Range _____	Range _____
	Sufficient room for maintenance activities.				
	Piping connections will provide adequate NPSH to prevent cavitation				
	Motor bearings are lubricated-if need be				
	Coupling guard in place and secured				
	All wiring is labelled and can be identified				
	Pump has been primed / air removed.				
	Check all components with the O&M manual				
	Pressure tank is appropriately charged	Pressure _____	Pressure _____	Pressure _____	Pressure _____
	Flow/Pressure on nameplate match design intent				
	Pump protection provided (Comment)				
	Pump rotation check performed.				
Sump Pumps	Method of lifting the pump out of the sump is provided. (comment)				
	Minimum water level/setpoint is set such that the motor is always submerged for cooling. (Record Setpoint)	Setpoint _____	Setpoint _____	Setpoint _____	Setpoint _____
	Cable is supported and not under stress or tension				

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-07
Dry Commissioning Pumps

Step	Action	Pump I.D. (✓, ✗, N/A)			
	Pump high and low level switches move freely without getting stuck				
Chemical Pumps	Hose is not kinked				
	Seals used appropriate for the chemical				
	Flow switch direction correct				
	Valves allow for isolation, flushing, filling, calibration and discharge				
	Tank is filled with water and pump is primed				
	Pump flow rate checked at 100% and 25% of rated flow. Record	Flow rate 25% _____ 100% _____	Flow rate 25% _____ 100% _____	Flow rate 25% _____ 100% _____	Flow rate 25% _____ 100% _____
	MFV settings adjusted (~1bar backpressure and ~6bar relief)				
Sludge Pumps	Protection Device installed and set (Temp / Flow / Pressure)	Setting _____	Setting _____	Setting _____	Setting _____
Additional					
	Hold Point				

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-09
Dry Commissioning Chemical Storage and Dosing System

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev: A**	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	**Action**	**Chemical Sytem I.D. (✓, ×, N/A)**			
General	Piping and installation complete according to the P&ID (Walk through- highlight P&ID/as built)	Drawing No. _____	Drawing No. _____	Drawing No. _____	Drawing No. _____
	Chemicals tanks, pipes and equipment are identifiable (at least temporary signage acceptable until final labels procured)				
	Check each valve operation & handle access/path				
	Fasteners are tight and supports are adequate				
	Pressure rating of pipe/equipment is adequate for this duty				
	No damage or leaks				
Tanks	Check correct tank capacity (Record capacity)				
	Fill the float with water, check level “empty” is correct & mark the indicator.				
	Scale and calibrate tank level transmitter. Perform “empty” mapping.				
	Fill the Dosing Tank with water Check the security bund remained empty				
	Scale and calibrate tank level transmitter. Check mapping was ok until “full”				
	Level transmitter reads >100% at least 5% before reaching the tank overflow level.				
	Adjoining valves fitted and functioning				

Step	Action	Chemical Sytem I.D. (✓, ✗, N/A)			
	Overflow sufficient in size comparative to inlet pipework				
	Inspection hatch / vent is fitted and functioning, vermin protection is fitted.				
	Check material compatibility of all seals, O-rings, pumps, valves etc… **Adhere to or seek advice:** Sulphuric Acid 51% – Viton Hypochlorite 12.5% – Viton Sodium Hydroxide 30% – EPDM Aluminium Chlorhydrate 23% – EPDM Soda Ash 5% – EPDM Sodium Metabisulphite – EPDM Polymers – EPDM (Viton if >2 year duty)				
Pumps	Check nameplate against data sheets	1- Tag: 2- Tag: 3- Tag: 4- Tag: 5- Tag:	1- Tag: 2- Tag: 3- Tag: 4- Tag: 5- Tag:	1- Tag: 2- Tag: 3- Tag: 4- Tag: 5- Tag:	1- Tag: 2- Tag: 3- Tag: 4- Tag: 5- Tag:
	Motors/pumps are level and secure				
	Adequate free air circulation for motor cooling				
	Suction strainers adequate and maintainable				
	Pressure switch/transmitters appropriately fitted and functioning. (Record PIT-XXXX)				

Step	Action	Chemical Sytem I.D. (✓, ✗, N/A)			
	Flow switch/rotameters appropriately fitted and functioning. (Record FIT-XXXX)				
	Direction of check valves are correct				
	PRV set at _____kPa	1- 2- 3- 4- 5-			
	Suction piping/tank is adequate. Connections will provide adequate NPSH to prevent cavitation.				
	Upstream/downstream valves are open and pump IOM manual start procedures followed				
	Suction/Discharge pressure gauge range is appropriate. (Record Range).	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-
	Sufficient room for maintenance activities.				
	Motor bearings are lubricated-if need be. Oil plugs are vented if need be.				
	All wiring is labelled and can be identified. If GPO's are used, cables and GPO's are both labelled uniquely and matching.				
	Pump has been primed / air removed.				
	Pressure tank / Pulsation dampener is appropriately charged (Record Pressure)	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-	1- 2- 3- 4- 5-
	Pump flow rate checked at 100% and 25% of rated flow (Record Result)	100/25% ____/____	100/25% ____/____	100/25% ____/____	100/25% ____/____

Step	Action	Chemical Sytem I.D. (✓, ✗, N/A)			
	Sufficient room for maintenance activities				
Discharge Pipework	Hose is not kinked				
	Double containment is sufficient (Corrosive chemicals only)				
	Dosing points are secure, splash guards in place (Corrosive chemicals only).				
	Clear tubing is not used if exposed to UV light				
Additional					
	Hold Point				

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 03-12
Dry Commissioning Ancillary Water and Air Manifolds

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item I.D. (✓, ✕, N/A)			
	Potable Water Manifold:				
Potable Water	RPZ or Registered 100mm air gap is fitted and functioning (Comment)				
	Safety showers come off before the RPZ. Hoses and other process come off after the RPZ. (or air gap)				
	Potable water flow is sufficient for the duty required				
	Additional notes:				
	Eyewash/ Safety Showers:				
Eyewash/ Safety Showers	Check that the units are connected to a potable water supply in accordance with AS-4775				
	Check units are identified with a highly visible sign complying with AS 1319 and that the signs are in good condition				
	Units are clearly visible and are well illuminated				
	Path of travel shall be free of obstructions that may inhibit the immediate use of the equipment. Ensure area near units are kept clear at all times. <7m from Chemical Hazards/filling points				
	Check that all parts are in place and are in good condition. Replace or repair broken, worn or missing parts				
	Shower is either a) shaded b) lagged c) has a thermal relief valveinstalled				
	Additional notes:				

Step	Action	Item I.D. (✓, ✗, N/A)			
	Sumps:				
Sumps	Check correct bund capacity	Capacity (kL) _____	Capacity (kL) _____	Capacity (kL) _____	Capacity (kL) _____
	Grate is flush with floor				
	General area slopes to the sump without pooling elsewhere				
	Easy access for cleaning /pump maintenance. Method of lifting pump is safe.				
	Sump high level alarm switch appropriately fitted and set at correct level (Record LS-XXXX)				
	Level transmitters appropriately fitted and functioning. (Record LIT-XXXX)				
	Sufficient room for maintenance activities				
	Additional notes:				
	Compressed Air Systems:				
Air Manifold	Compressor Pressure and Free Air Delivery is adequate	Pressure: FAD:	Pressure: FAD:	Pressure: FAD:	Pressure: FAD:
	Air receiver volume adequate	Volume:	Volume:	Volume:	Volume:
	Dryer fitted, installed correctly and functioning				
	PRV is fitted and set to (record setting)				
	Low air pressure switch/transmitter is fitted and set to (record setting)				
	Filter is supplied and fitted (record details)				
	Direction of air through the manifold is correct.				

Step	Action	Item I.D. (✓, ✗, N/A)			
	Air Compressor cut in pressure: (record setting)				
	Air Compressor cut out pressure: (record setting)				
Additional					
	Hold Point				

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 04-01
Wet Commissioning

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri,		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
HMI Set and Test	Set all equipment to OFF	Begin with all equipment OFF on the HMI		Yes / No	
		Field isolators in the OFF position		Yes / No	
	Insert process and alarm set points	Manually enter appropriate values on HMI		Yes / No	
	Eliminate all alarms	Work through errors and alarms such that the majority are cleared; The aim is not yet to have the system running, but in a state ready to test individual components and alarms.		Yes / No	
Check Digital Inputs/ Outputs	Check soft signals correctly correlate to field actions by manually toggling them ON & OFF or triggering signals in the field.	Tick on P&ID all Level/ pressure/ flow **switch status changes:** e.g. LSH / LSL Record any failures below:	P&ID attached	Yes / No	
		Tick on P&ID all switch **alarms triggered:** Record any errors below:	P&ID attached	Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Check Digital Inputs/ Outputs	Check soft signals correctly correlate to field actions by manually toggling them ON & OFF or triggering signals in the field.	Tick on P&ID all actuated valve **status changes:** O / C. Record any failures below:	P&ID attached	Yes / No	
		Tick on P&ID all actuated valve **alarms triggered:** Fail O/ Fail C Record any errors below:	P&ID attached	Yes / No	
		Tick on P&ID all motor operation **Manual on / Manual off:** Record any failures below:	P&ID attached	Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Check Digital Inputs/ Outputs	Check soft signals correctly correlate to field actions by manually toggling them ON & OFF or triggering signals in the field.	Tick on P&ID all motor operation **Alarms triggered:** Motor fault Record any errors below:	P&ID attached	Yes / No	

Step	Action	Description Tag No Range/Units	Simulated mA input	Measured Current (mA)	Scaled Reading	HMI Reading	Initial/Sign
Check analogue inputs/ outputs	For each analogue item on the P&ID, tick off a scaling check: Simulate 4 – 20 mA analogue instrument inputs using instrument calibration mode (if available) Check analogue signals match the correct field transmitters. Scale field instruments if required. Scale PLC input if required.		4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				

Step	Action	Description Tag No Range/Units	Simulated mA input	Measured Current (mA)	Scaled Reading	HMI Reading	Initial/Sign
Check analogue inputs/ outputs	For each analogue item on the P&ID, tick off a scaling check: Simulate 4 – 20 mA analogue instrument inputs using instrument calibration mode (if available) Check analogue signals match the correct field transmitters. Scale field instruments if required. Scale PLC input if required.		4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				
			4				
			20				
			Comment				

Step	Action	Item	Reference	Confirmation	Initial/Sign
Test Faults and interlocks	Manipulate settings or field parameters to check faults are successfully triggered & correlate to correct WTP actions.	Refer to Functional Description/Trip and Interlock List/Set Point Register and confirm all faults and interlocks. Ensure delays and functionality are suitable. See attachment.		Yes / No	
Check SMS/email alert system functionality	Verify	SMS/email alerts received at correct critical faults. Importantly:		Yes / No	
		General system fault		Yes / No	
		High and low tank level alarms		Yes / No	
		High and low analysis alarms		Yes / No	
		Motor/Sensor fail alarms		Yes / No	
		Inlet Valve Closed alarm		Yes / No	
Simulate start up after power failure	Verify	UPS maintains control system online sufficient time to send a power failure SMS		Yes / No	
		All setpoints are retentive on regaining power		Yes / No	
		System can be easily started again: list steps		Yes / No	
	Hold Point	Ready for Operation?		Yes / No	

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 05-01
Process Commissioning

ENVIROPACIFIC

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Prepare chemical tanks for filling	Drain & Fill	All chemical tanks (currently filled with water from hydrotesting) should be drained to empty **Ensure bunds are emptied first to prevent 'floating' internal tanks**		Yes / No	
		Follow SWMS chemical fill procedures ensuring: Correct PPE is worn: Safety showers are tested: Hazchem spill kit is available: Tightness of fittings is checked: Capacity in the tank is sufficient: The correct chemical is decanted: Area is washed down afterwards:		 Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No	
Fill chemical tanks	- Ensure piping is connected in a way to avoid leaking of chemicals - Tanks filled with Chemicals - Hazardous Materials spill kit on hand in case of spill.			Yes / No	
				Yes / No	
Provide raw water feed to WTP	Sample, test, observe, refine	- Samples taken, tested and analysis attached.		Yes / No	
Determine the inlet dosing control settings to target pH	Dosing for pH control Adjust and refine	- pH target is reached - pH target is not significantly overshot - pH within the feed line within ±0.5pH of the target setpoint - Lag has been observed and causes no process issues - Record setpoints in the summary at the end of this ITR	pH target _____	Yes / No	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Determine the dose rates for primary settling	Sample	Take a sample of influent and determine the correct COAGULANT dosing rate	Rate (mg/L) _____	Yes / No	
	Sample	Take a sample of influent and determine the correct POLYMER dosing rate	Rate (mg/L) _____	Yes / No	
	Comments:				

Step	Action	Item	Reference	Confirmation	Initial/Sign
Determine the break point chlorination dosing settings	Adjust and refine Sodium Hypochlorite dosing	-Free Cl is reached -Free Cl target is not significantly overshot -Free Cl within TK-0401 is within ±0.1mg/L of target setpoint -Lag has been observed and causes no process issues -Record setpoints in the summary at the end of this ITR	Cl target _____ mg/L	Yes / No	
Determine the SMBS dosing settings	Adjust and refine SMBS dosing	-Target ORP is reached -Target ORP is not significantly overshot -Control loop results in ORP that does not exceed the target any more than 5% of the time it is in operation -Lag has been observed and causes no process issues -Record setpoints in the summary at the end of this ITR	ORP target _____ mV	Yes / No	
Determine desludging settings	Test, monitor and record	-Target sludge discharge times greater than 30 sec -Confirm correct sequencing		Yes / No	
		Target discharge times less than 300 sec to capture mainly settled sludge		Yes / No	
		Target interval times and net discharge do not overcome sumps, sludge holding tanks or other downstream processes?		Yes / No	
		Determine discharge frequency to prevent sludge build up		Yes / No	
		Set sludge pump speed to assist with above volumes and times and record		Yes / No	
		Confirm clarifier performance and low overflow solids loading		Yes / No	
		Confirm ISR performance and low overflow solids loading		Yes / No	
Determine Filters Backwash Settings	Filter 1	DP warning:			
		DP alarm:			
		Backwash flow target:			
		Backwash timer:			
	Filter 2	DP warning:			
		DP alarm:			
		Backwash flow target:			

Step	Action	Item	Reference	Confirmation	Initial/Sign
		Backwash timer:			
Determine Filters Backwash Settings	Perform a full backwash sequence of train 1	Tank level settings appropriate? Raw start: Raw stop: TW start: TW stop:		Yes/No	
		Logic allows plant to initiate backwash and won't be held up by feed tank level?		Yes/No	
		Sequence of automatic valve/pump operation is correct?			
		Backwash sequence can be run for approx. 10 min or longer?		Yes/No	
	Observe backwash effect on influent from flow balance tank and comment on:	Influent pH:			
		Influent turbidity:			
		Clarifier performance:			
		Any recommendations/alterations required to correct for backwashing impact on influent		Yes/No	
Determine polymer make down system settings	Pipe Flocculator make polymer down system Adjust and refine:	-Aim for 0.1-1% dilution range -Satisfy that dilute polymer pump is within its pumping range -Record setpoints in the summary at the end of this ITR	Conc. Set _____	Yes/No	
	Screw press polymer make down system Adjust and refine:	-Aim for 0.1-1% dilution range -Satisfy that dilute polymer pump is within its pumping range -Record setpoints in the summary at the end of this ITR	Conc. Set _____	Yes/No	
Determine discharge system setpoints	Sample, test, observe, refine	-Discharge ITP/ITR process is manageable -Treated water to site discharge point tested -Recirculation/reuse system tested -No undue alarms create process issues during discharging (i.e. low-level alarms).			
		Samples taken, tested for all Treated Leachate Target contaminants			

Step	Action	Item	Reference	Confirmation	Initial/Sign
		Analyse sample results to determine if all Target criteria have been met and share the analysis report with the client.		Yes/No	
		Client sign off for discharge of Treated Leachate		Yes/No	
Record all commissioning setpoints (after system has operated consistently for a few days)					

COMMENTS

Action Required					
Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project					
Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion					
ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed

Commissioning Manager Sign Off:				Date:	

ENVIROPACIFIC PTY LTD
INSPECTION AND TEST REPORT 06-01
Operation of TWTP – Discharge of Treated Leachate

Project Title: HAKK TWTP		**Project No:** 105079	
Location: Kurri Kurri, NSW		**ITR Rev:** A	**Lot No.:**
Prepared By: Fahad Saleem	**Approved By:** Patrick Puddefoot	**Date:**	
Reviewed By:	Patrick Puddefoot	**Date:**	
Completed By:	**Signed:**	**Date:**	

Step	Action	Item	Reference	Confirmation	Initial/Sign
Provide raw leachate to the TWTP	Start up TWTP	TWTP is operational and transferring leachate from the Leachate Holding Pond to the TWTP		Yes / No	
Sample the raw feed to the TWTP	Sample the raw leachate entering the Flow Balance Tank prior to pH correction	- Samples taken, tested and analysis attached.		Yes / No	
General operation of the TWTP	Operate and optimise the TWTP operation	Comment any process or plant issues experienced during operation		Yes / No	
Sample the Treated Leachate	When one of the Treated Water Tanks is full, sample the tank water for analysis	Samples taken, tested and analysis attached.		Yes / No	
Report results to client	Collate raw and treated analysis	Analyse the Raw and treated leachate results to check if Target Criteria has been met and issue to client to review		Yes / No	
Client sign off for discharge	Seek approval to discharge	Client sign off for discharge of Treated Leachate		Yes / No	

COMMENTS

Action Required

Action on: M = Mechanical, E = Electrical, I = Instrumental, P = Project

Priority: 1 = Complete before start-up, 2 = Complete after start-up, 3 = For discussion

ID	Description (Air-bleed/Valve/)	Action Required	Action on	Priority	Completed/Date/Signed
Commissioning Manager Sign Off:				Date:	

DOC22/33303-1

Ramboll Australia Pty Ltd.
PO Box 435
THE JUNCTION NSW 2291

Email: staylor@ramboll.com

Attention: Mr Shaun Taylor

20 January 2022

Dear Mr Taylor,

HYDRO ALUMINIUM REMEDIATION PROJECT – DRAFT MANAGEMENT PLANS

I refer to your email to the Environment Protection Authority (EPA), received on 18 January 2022, inviting the EPA to comment on the draft Temporary Water Treatment Plant Management Plan, draft Irrigation Management Plan and draft Water Quality Monitoring Program being prepared in respect of the Hydro Aluminium Remediation Project.

The EPA encourages the development of such plans to ensure that proponents and licensees have determined how they will meet their statutory obligations and designated environmental objectives.

Being a regulatory authority, the EPA's role is to administer and regulate statutes for environmental management and protection. As such the EPA does not directly get involved in the development of strategies to achieve those objectives and does not review or comment on such plans. Accordingly, the EPA has not reviewed and offers no comments on the above management plans.

If you have any questions about this matter, please contact Hamish Rutherford on (02) 4908 6824 or email info@epa.nsw.gov.au.

Yours sincerely

CLAIRE MILES
Acting Manager Metro North
Environment Protection Authority

cc. Mr Richard Brown
Hydro Aluminium Kurri Kurri Pty Ltd
Email: richard.brown@hydro.com