

Capacity Increase of SPL Processing Facility at Tomago

Construction Safety Study

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Study prepared by:

Regain Services Pty Ltd

www.regainmaterials.com



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Executive Summary

Background

Regain Services Pty Ltd (Regain) currently operates a Spent Potlining (SPL) Processing Facility at the Tomago Aluminium Smelter in the NSW Hunter Valley region. To meet current and projected demand for SPL, the SPL Processing facility at Tomago requires a capacity increase.

This Construction Safety Study has been prepared to support construction and operation of the process plant required for increased processing capacity of the Spent Potlining Recycling Facility located inside the boundaries of the Tomago Smelter. The current facility operates under NSW Department of Planning, Industry and Environment Major Project Approval MP06_0050 dated 7th August, 2009. The Project is the subject of NSW Department of Planning, Industry and Environment (DPIE) Major Project Approval MP06_0050 as modified MOD 2 dated 22 August, 2019 (MP06_0050 MOD 2). Schedule 3, Condition 16 (b) of MP06_0050 MOD 2 requires a Construction Safety Study to be prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 7 'Construction Safety' (HAPIP 7).

Purpose and Scope of Study

The purpose of the study is to ensure that hazards associated with the expanded SPL Process Plant are identified, and appropriate safeguards are implemented to address the hazards. The study relates to the approved development, which includes additional 40,000 tonnes per year SPL Treatment Plant proposed to be installed adjacent to an existing 20,000 tonnes per year SPL Treatment Plant. This is Stage 1 of the approved development.

The scope of the study is defined by the HIPAP 7 which identifies two important aspects regarding overall plant safety, which are

- The hazards which arise in the construction process can result in significant levels of risk to surrounding land uses; and
- For the plant to operate safely, it is essential that it is constructed in accordance with design intent, and to an appropriate level of quality.

A Construction Safety Study team was formed to address considerations contained in HAPIP 7. The team was comprised of Regain people and a consultant engineer who are familiar with the existing plant, the approved SPL Treatment Plant, the plant process design and the construction program.. The study team included people with overall responsibility for safety performance at Regain and who have the authority to allocate resources and ensure that recommendations of the study are implemented.

Consistent with the requirements of HIPAP 7, this study does not directly address construction workplace occupational health and safety.

Major Hazards and Controls

The major, potential hazardous incidents and proposed control measures identified during the study are shown in table 1.

Table 1 – Summary of Major Hazards and Safeguards

Area / Activity	Hazard	Consequences	Proposed Safeguards
<i>Construction Phase</i>			
Construction site	Overturning crane jib hitting main electrical substation north of construction site	Fatality due to electrocution Shutdown of power supply to part of smelter	Prepare thorough lift plans for large crane lifts and triple check with Regain and Tomago Aluminium personnel Ensure crane jib is not extended far enough to hit substation in event of crane overturning
<i>Commissioning Phase</i>			
SPL Treatment Plant rotary kiln burner system	Natural gas in confined space	Explosion of gas or fire	Ensure gas exhaust pathways and always open vents are clear and as designed Have combustion engineer present during commissioning of kiln burner system
SPL Treatment Plant reactor	Flammable gas from reaction of SPL and water trapped in confined space	Explosion of gas or fire	Ensure gas exhaust pathways and always open vents are clear and as designed

Major Findings

This Construction Safety Study resulted in identification of six hazards (including the three major hazards in table 1) that could present risk to process safety. The Study Team reviewed the safeguards and were satisfied that proposed safeguards represented the most reasonably practicable approach to preventing events (loss events) that could lead the worst-case consequences. Each of the proposed safeguards is within Regain's organisational capacity and Regain has successfully implemented these safeguards on prior occasions.

There were no hazards and associated loss events that were identified, which present a risk of propagation beyond the site boundary. The site is appropriately set back from other assets and people on the smelter site. The construction and commissioning work will involve well-established industrial practices to be performed by organisations and people who are experienced in this work and in undertaking this work at the SPL Processing Facility at Tomago.

This study has confirmed that the use of existing Regain procedures currently implemented for operations at the existing SPL Processing Facility will address most of the operational safeguards required for process safety. Certain additional safeguards will be identified in a Project Construction and Commissioning Plan to be prepared and then implemented specifically for the construction and commissioning phase. Establishment of these safeguards is well within the capability of the current Regain organisation and people.

Safety assurance for the project can be achieved using the current Regain management system which is designed to comply with the requirements of AS/NZS ISO 9001, AS/NZS ISO 45001 and AS/NZS ISO 14001 Quality, Safety and Environment Management Standards.

This study included a review of construction and commissioning programs. The program allows sufficient time for addressing hazards issues and for preparation of submissions required under the Development Approval and assessment of approval requests.

If the project schedule is disrupted in a way that may affect process safety and require change during construction then the default position is that project schedule will be extended to accommodate the disruption. If problems arise during construction and commissioning that necessitate permanent change then these will be addressed using the Regain change management system which is well established and appropriate for the SPL Treatment Plant.

1. Outline of Proposed and Existing Operations

1.1. Site Location and Surrounding Land Uses

The proposed and existing SPL Treatment Plants are part of the SPL Processing Facility located on the site of the Tomago Aluminium Smelter operated by Tomago Aluminium Company Pty Ltd (TAC) and is located on Tomago Road approximately 25 kilometres by road north west of Newcastle, NSW.

The site for the existing plant and the proposed new plant is a 50 metre by 50 metre area between two existing buildings (Shed 5 and Shed 6 respectively). The SPL Process Plant site, Shed 5 and Shed 6 are part of the SPL Processing Facility operated by Regain with land and buildings leased from TAC. An amenities building, site laboratory and spare parts store are located within the SPL Process Plant site (see next section).

The surrounding land is within the Tomago Aluminium Smelter site. Figure 1 shows the site for the SPL Processing Plant in the context of surrounding land. Other facilities and activities on the surrounding land are:

- Access road located immediately to the north of the site with the main electrical substation for the Tomago smelter located north of the access road
- SPL delining facility where the spent potlining (SPL) is removed from the electrolytic reduction pots is located adjacent to the south west corner of the SPL Processing Facility
- Amenities building located approximately 100 metres east of the site
- Electrolytic reduction potline No. 1 for the Tomago smelter with its nearest point approximately 100 metres north east of the site
- Open storage area to the south of the site
- Bulk storage shed located approximately 200 metres south west of the site.

All surrounding land, facilities and activities are associated with the TAC and the Tomago smelter.



Figure 1 Site Location and Surrounding Land

1.2 Site Layout

A plan of the site showing plant locations and buildings is shown on the drawing number 116TD156 in Appendix A. Figure 2 shows the site with the existing SPL Treatment Plant and the new SPL Treatment Plant.

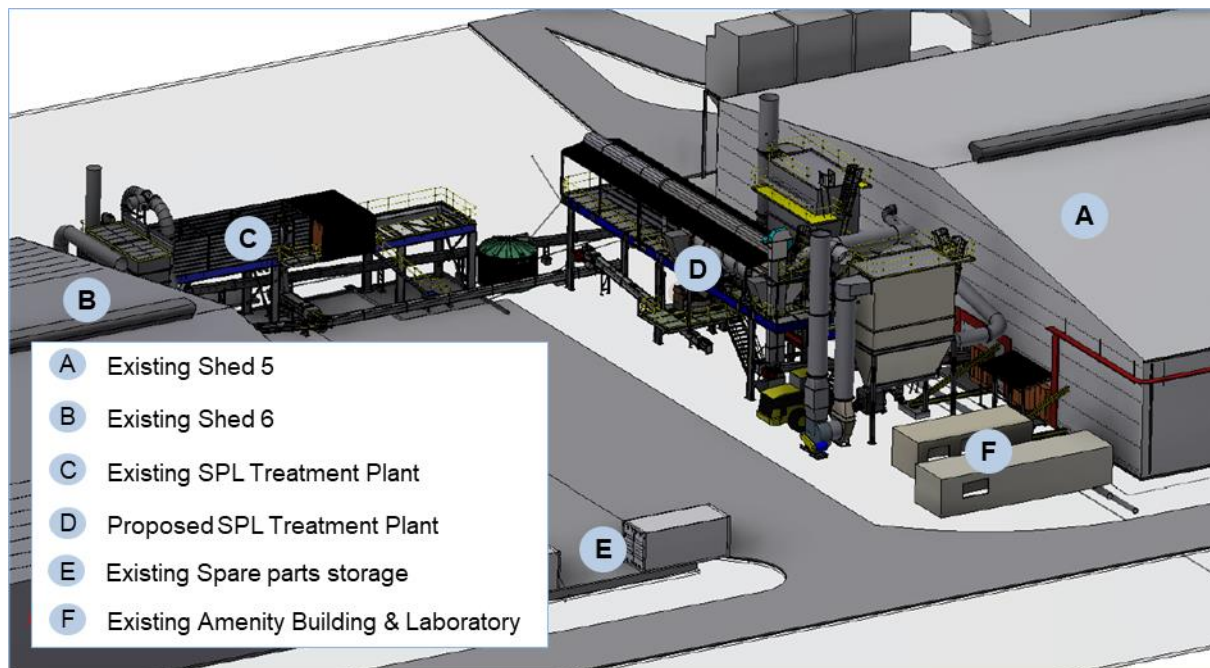


Figure 2 Existing SPL Plant and New SPL Treatment Plant

The approved SPL Treatment Plant is to be constructed in an open area to the east of Shed 6 and consists of:

- A rotary kiln which is to be delivered as a pre-assembled module,
- A reactor which is to be delivered as a pre-assembled module,
- Two baghouse dust collectors which are to be delivered fully assembled,
- Materials handling equipment for feed and discharge
- Fans and ducting to the baghouse dust collectors.

The area between the approved SPL Treatment Plant and Shed 6 is an open paved area. A construction crane will be positioned in this area during the construction period when the plant modules, dust collectors and associated equipment are being erected.

1.3 Purpose of Proposed Operation and Major Process Steps

Aluminium metal is produced in electrolytic cells known as pots. During the aluminium production process, the lining of the pots become contaminated with materials such as alumina, aluminium, calcium, fluoride compounds and sodium. The contaminated potlining, known as spent potlining (SPL) is regularly replaced as part of the periodic individual rebuilding of the pots. SPL is classified as a Dangerous Good and an Environmentally Hazardous Waste. Hazards associated with SPL are the presence of cyanide and a propensity to react with water and generate flammable gases, mostly hydrogen and methane. SPL requires careful handling and disposal in accordance with regulatory requirements.

Regain has worked with a number of smelters in Australia to process SPL to make it safe to handle and use and to manufacture products using the materials from SPL. The products are used in cement manufacture to reduce the energy input and greenhouse gas emission. Regain has recycled more than 370,000 tonnes of waste material from aluminium smelters and has been operating at the Tomago Aluminium Smelter since 2001. The Regain SPL Treatment Facility at Tomago currently processes 20,000 tonnes of SPL per year.

There is a backlog of SPL stored in stockpiles in Australia, which is driving the demand for increased SPL recycling capacity.

The process function of the SPL Treatment Plant is to eliminate cyanide and flammable gas hazards in SPL, such that the treated material is safe to handle and use. The major steps in the SPL treatment process are as follows:

1. Crushed SPL is fed to the rotary kiln where it is heated with natural gas to approximately 600 degrees Celsius to destroy the cyanide in SPL.
2. The heated SPL discharges from the rotary kiln to the hydrolysis reactor where the SPL is mixed with water. The water reacts with the SPL producing a mixture of gases including ammonia, hydrogen and methane. These gases are immediately transferred to the rotary kiln burning zone where the hydrogen and methane are burned with the natural gas fuel in the kiln. A portion of the water is converted to steam as it cools the SPL to a safe temperature prior to discharge from the reactor. The steam is also transferred to the rotary kiln. The reactor operates near atmospheric pressure.
3. Gases of combustion and steam are drawn through the rotary kiln through baghouse dust filtration and collection system by an induced draft fan.

1.4 Existing Operations and Contractors

Existing Operations

Existing operations at the SPL Processing Facility involve:

- Receiving and crushing SPL in Shed 5
- Processing the SPL through the existing SPL Treatment Plant
- Testing the treated materials to verify that cyanide destruction and hydrolysis reactions have eliminated the cyanide and flammable gas risks and then blending the treated materials in Shed 6 to make products for shipment off site.

The SPL Processing Facility operates 24 hours per day, seven days per week. The SPL Treatment Plants operate under automated process control systems. Operating the SPL Processing Facility including dispatching products and day to day plant servicing typically involves a workforce of three to five people and mobile equipment such as front-end loaders and fork lifts. Scheduled maintenance shutdowns take place which typically involve a maintenance crew of three to five people.

The existing SPL Treatment Plant capacity is 20,000 tonnes per year. Whereas the approved SPL Treatment plant will add 40,000 tonnes per annum capacity. The additional capacity is expected to require two additional operations people.

Approved Plant Construction

Construction of the approved SPL Treatment Plant is a relatively small construction project. It will involve the installation of approximately 150 tonnes of steel and mechanical equipment over a six-week construction period.

Construction activities for the approved SPL Treatment Plant will involve the erection of steel structures on concrete foundations as well as the installation of process equipment on the steel structures. To minimize on site activities and associated personnel levels the process equipment will arrive on site as pre-assembled plant modules. The erection of the plant will be done with mobile hydraulic cranes.

Average construction field personnel level will be five people with an estimated maximum number of up to ten people for short periods such as during plant module lifts. There are existing lunch rooms and personnel amenities on the site. Typical construction personnel skills required are:

- Riggers
- Fitters
- Electricians
- Trades Assistants.

The largest expected crane size is a crane with 250 tonne lifting capacity for installing the modules. Installation of interconnecting conveyor systems, ducting and steel work will be typically done using 20 tonne capacity mobile hydraulic cranes. Access for construction for work at height will be either from elevated work platforms (EWPs) or from permanent plant access platforms.

Contractors

Regain will provide management of construction and management of the interface with Regain operations. Specialist installation contractors are to be engaged for construction and commissioning:

- ACR Pty Ltd for structural steel and mechanical installation
- Focused Solutions Pty Ltd for electrical installation
- Intelligent Energy Services Pty Ltd for plant commissioning.

Each of these contractors is inducted to the Tomago site and has prior experience in dealing the Regain process plant and the associated hazards. Regain has managed the construction and commissioning of a number of similar process plants.

2. Study Methodology

2.1 General Approach

The study methodology followed the approach set out in the HIPAP 7, which included the following objectives:

- To identify potentially hazardous incidents during construction, and to identify appropriate upgrading and revision of programs, safeguards and safety and emergency procedures; and
- To ensure that all measures are in place, so that the selection, checking, fabrication; and construction, and commissioning of all the safety critical elements of the facility are in accordance with the design intent and specifications, consistent with requirements and findings arising from other safety studies, and that the design and specifications are appropriate.

This study was conducted using a Hazard and Loss Event Prevention (HAZLEP) approach which aligns with the construction safety study process set out in HIPAP 7 and the Hazardous Industry Planning Advisory Paper No. 8, "HAZOP Guidelines" (HIPAP 8). This approach also informed the way in which Regain addresses hazard identification, risk assessment and control. The HAZLEP approach involves:

- Identification and analysis of the hazards,
- Forecasting credible consequences in the form of potential loss events
- Considering all credible options for controlling the risk and then defining the reasonably practicable safeguards required to eliminate risk associated with the hazards or, if the risk cannot be eliminated, then the safeguards required to limit the extent of damage or harm if a loss event actually occurs.

The Construction Safety Study team (Study Team) were introduced to the need for the study and the HIPAP 7 framework and process. Documents from other safety studies were provided and the Study Team met in a workshop meeting to identify hazards and the most reasonably practicable means by which hazards could be eliminated or controlled. This Construction Safety Study was then drafted and reviewed by the Study Team prior to finalisation and issue.

2.2 Study Team

The Study Team was comprised of Regain people and a consultant engineer who are familiar with the existing plant, the approved SPL Treatment Plant, the plant process design and the construction program. The people involved in the study along with their role titles and accountabilities with respect to the proposed new SPL Treatment Plant are set out in Table 2.

Table 2 – Study Team

Name	Role Title	Accountabilities
Bernie Cooper	Regain Managing Director	Overall plant performance and safety Ensuring required resources are available and that the recommendations of this study are implemented.
John Cooper	Operations Support Manager	Validation that plant is fit for purpose for operations Handover of plant to operations Training of operators
Kevin Cooper	Development Manager and NSW Regional Manager	Liaison with DPIE, NSW EPA and specialised consultants Ensuring requirements of Development Approval MP06_0050 and MOD 2 are incorporated into the plant construction
Andrew Dinning	Consultant Mechanical Engineer	Documentation of process and mechanical design of the plant
Glenn Mullen	Project Manager	Delivery of the project including construction and commissioning of the plant

2.3 Prior Experience and Other Safety Studies

The Study Team included people with twenty years of experience working with Regain and processing hazardous waste from aluminium smelters. Inputs to this Construction Safety Study included lessons learned from operations and safety studies specific to the approved SPL Treatment Plant as follows.

1. A Gap analysis included in the Environmental Assessment prepared by AECOM for the SPL processing capacity expansion at Tomago. The gap analysis was prepared in 2018 based on a Preliminary Hazard Assessment performed by SKM for the 2009 Development Approval.
2. A Design Risk Analysis report prepared in October 2019 as part of the plant design process for the SPL Treatment Plant (Regain document reference 246R002).
3. A Report from Hazard and Operability Study (HAZOP) for the SPL Treatment Plant undertaken in November 2019.

3. Hazards Identified and Proposed Safeguards

3.1 Hazardous Materials

Hazardous materials that are to be used during construction or processed during commissioning are:

- Epoxy sealants
- Paints and thinners
- Diesel fuel for vehicles
- Spent potlining.

These materials are used during operations with appropriate safeguards and a Hazardous Materials Register which is maintained at the facility. These same safeguards and systems for dealing with hazardous materials used by Regain Operations will be applied during construction and commissioning of the approved SPL Treatment Plant.

There is no requirement to store diesel fuel on the site. Construction vehicles will arrive on site fully fuelled. If a vehicle needs to be fuelled near the site Regain has access to a Tomago Aluminium diesel fuelling station located on the smelter site.

3.2 Identification of Hazards and Safeguards

The hazards, worst case consequences and proposed safeguards identified during this study are provided in table 3.

Table 3 –Hazards and Safeguards Word Diagram

Area / Activity	Hazard	Consequences	Proposed Safeguards
<i>Construction Phase</i>			
Utilities zone to east of Shed 5	High voltage electrical cable strike hazard	Fatality due to electrocution Shutdown of power supply to local area	Verify cable location No construction within one metre of cable
Transport of 50 tonne kiln module on public roads		Traffic disruption on public roads Traffic accident	Ensure all regulatory permits of over-dimensioned load in place Use fully licenced transport provider with past experience
Construction site	Overtuning crane jib hitting main electrical substation north of construction site	Fatality due to electrocution Shutdown of power supply to part of smelter	Prepare thorough lift plans for large crane lifts and triple check with Regain and Tomago Aluminium personnel Ensure crane jib is not extended far enough to hit substation in event of crane overturning
Construction site	Overtuning crane jib hitting existing SPL Treatment Plant	Hot gas escape if plant is operating Natural gas pipe rupture with fire Damage to existing SPL Treatment Plant	Prepare through lift plans for large crane lifts and triple check with Regain and Tomago Aluminium personnel Turn off and isolate natural gas supply when heavy crane lifts are underway Shut down existing SPL Treatment Plant when heavy crane lifts are underway
<i>Commissioning Phase</i>			
SPL Treatment Plant rotary kiln burner system	Natural gas in confined space	Explosion of gas or fire	Ensure gas exhaust pathways and always open vents are clear and as designed Have combustion engineer present during commissioning of kiln burner system
SPL Treatment Plant reactor	Flammable gas from reaction of SPL and water trapped in confined space	Explosion of gas or fire	Ensure gas exhaust pathways and always open vents are clear and as designed

3.3 Analysis of Hazards and Safeguards

The Study Team reviewed the safeguards and were satisfied that they represented the most reasonably practicable approach to preventing events (loss events) that could lead to the worst-case consequences. Each of the proposed safeguards is within Regain's organisational capacity and Regain has successfully implemented these safeguards at the existing SPL Processing Facility.

There were no hazards and associated loss events identified that present a risk of propagation beyond the site boundary. The site is clear of other assets and people on the smelter site. The construction and commissioning work will involve well-established industrial practices to be performed by organisations and people who are experienced in this work and in undertaking this work at the SPL Processing Facility at Tomago.

4. Assessment of Operational Safeguards

A Project Construction and Commissioning Delivery Plan to cover construction and commissioning of the SPL Treatment Plant is under preparation. To the extent that is appropriate, this plan will make use of existing procedures and safe work methods such that it is harmonised with the Safety Management Plan and associated safety management system that apply to existing SPL Facility operations. This also means that the construction and commissioning safeguards are properly integrated with the Tomago aluminium smelter operational safeguards. This is particularly relevant for emergency procedures and site access control.

Safeguards based on the use of procedures and work methods currently in place for operations at the SPL Processing Facility are proposed for:

- work and entry permit systems
- Hot work procedures
- Isolation and tagging procedures
- Procedures for control of onsite work by contractors
- Access arrangements for external personnel and vehicles
- Emergency procedures
- Availability of materials safety data sheets for hazardous materials
- Operating procedures for adjacent plant, along with any additional procedures required during construction activities
- Fire safety and fire-fighting arrangements
- Incident/injury reporting systems

Safeguards that are expected to require specific procedures and work methods to be developed separately and identified in the Project Construction and Commissioning Delivery Plan include:

- Operating procedures for construction and commissioning activities
- Arrangements for security of PLC/SCADA logic
- Training/qualifications requirements specific to construction and commissioning.

Primary responsibility for the safeguards based on procedures and work methods currently in place for operations at the SPL Processing Facility will be with the Regain Operations Manager (Mr Roy Elliott). In the event of Mr Elliott's absence, the Regain Operations Support Manager (Mr John Cooper) will assume these responsibilities. Primary responsibility for the safeguards requiring specific procedures and work methods to be developed separately will be with the Project Manager for construction and commissioning of the approved SPL Treatment Plant (Mr Glenn Mullen). Specific responsibilities of other people involved in construction and commission such as contractor personnel and their contact details will be set out in the Project Construction and Commissioning Delivery Plan.

Development Approval M65_0050 MOD 2 requires an Emergency Plan and Safety Management System documentation to be prepared no later than two months prior to commencement of commissioning. The Project Construction and Commissioning Delivery Plan will also be consistent with these documents.

5. Safety Assurance

5.1 Safety Assurance Philosophy

Safety assurance means Regain must be able to establish that:

‘there are no prohibitively dangerous aspects in the business and that all reasonably practicable precautions are in place for all foreseeable, credible, critical issues.’¹

Safety assurance at Regain has three major parts as follows.

1. **Critical issues** and other matters that may cause a material loss are recognised in the form of credible loss events. Loss events are defined through developing a comprehensive review and understanding of the hazards that may be prevailing, the type of harm that the hazard may cause and how the harm could eventuate.
2. **Practicable precautions** are identified that could either prevent each credible loss event or to mitigate the harm that may result from the loss event. In the first instance, any and all precautions that are conceivably relevant are considered. The precautions that are reasonably practicable are selected for implementation after appropriate evaluation of the seriousness of the potential loss event, the feasibility (both practical and economic) of implementing the precaution and the application of the following hierarchy of control:
 - Elimination of the hazard or the possibility of the loss event
 - Substitution of equipment or method with an alternate approach that is less hazardous
 - Engineering solutions to isolate the hazard
 - Administrative procedures such as safety rules.
3. **Regain Management System (RMS)** to ensure the selected precautions are implemented with objective evidence of due diligence and sustained into the future with appropriate audit and review. The RMS:
 - Is designed to comply with the requirements of AS/NZS ISO 9001, AS/NZS ISO 45001 and AS/NZS ISO 14001 Quality, Safety and Environment Management Standards
 - Is the central platform for coordinating and administering the Regain organisation with particular focus on managing risk
 - Operates on an enterprise grade lifecycle management application software platform.

5.2 Safety Assurance Implementation

Critical process safety issues and appropriate precautions are identified and documented on an ongoing basis and through formal studies and reviews prior to commencement of construction. This work for the SPL Treatment Plant included:

1. Plant Requirements Document that set out process hazards and how the associated risks are to be addressed.
2. Design Risk Analysis workshops to assess the design of particular sections of the plant to ensure the process (and other) risks are being appropriately recognised, to ensure that available practicable precautions have been considered and that risks are managed throughout the plant lifecycle.
3. Hazard and Operability Study to systematically check through the process and plant as it is designed to identify hazards and define controls required to eliminate or mitigate risk.
4. This Construction Safety Study providing a structured review of the construction and commission phases of the development with identification of hazards, potential loss events and required risk controls along with a pre-construction check on the design with regard to process risk and the precautions required to safely build and commission the plant in accordance with the design intent.

¹ Robinson, et al, "Engineering Due Diligence", R2A Pty Ltd, 2016

To be effective a safety assurance system must address the complexity associated with a process plant such as the approved SPL Processing Plant. The complexity results from:

- The large number of items (or objects) that can affect process safety that must be managed
- The fact that these objects change over their lifecycle
- The intricate interrelationships between the objects such that they may affect each other.

These objects are items such as plans, procedures, work methods, requirements, process plant functional locations, plant equipment items, parts, materials, specifications, functional descriptions, drawings, inspection & test plans, other documents and pieces of software.

The Regain Lifecycle Management System (LMS) is an electronic compute application software platform within the Regain Management System (RMS), in which the lifecycle of each object is traced and the interrelationships between the objects are mapped. A typical object lifecycle involves stages such initiation, preparation (including design), verification, review and release for use (approval). If an object is subject to change after it has been released for use then the verification, review and release stages are repeated.

Key elements of the safety assurance system during construction and commissioning are set out in table 4.

Table 4 – Safety Assurance System Elements

Element	Approach to Safety Assurance
Involvement of all participants	Equipment and material suppliers and manufacturer/fabricators (Suppliers) involvement in the safety assurance system is through the requirement to comply with Regain specifications for materials to be supplied, manufacturing or fabrication and inspection including reference to relevant Australian standards. Installation contractor (Contractor) personnel are required to undertake Regain induction which includes instruction on process safety and construction/commissioning risks and their control. Contractor quality control documents such as inspection & test plans will be approved by Regain or Regain quality control documents will be used for construction and commissioning. Senior Regain Managers were or will be involved in all significant safety studies and reviews.
Documentation	Electronic copies of all procedures, work methods, authorisations, inspection reports and certification reports are/will be uploaded and stored in the LMS. Copies of original documents will be retained on site in record book folders with a back-up copy retained at the Regain central office. After commissioning is completed the original documents will be progressively transferred to secure archive storage. Drawings and specifications are to be stored electronically as controlled objects in the LMS. Drawings are cross-referenced to each work package. The scope of each Supplier or Contractor involves one or more work packages. If a drawing, specification or other document that is associated with a work package that has been issued to a Supplier or Contractor then the Supplier or Contractor is notified of the changed document as part of Regain document control and the most recent version of the document is transmitted to the relevant people. Manufactured items are identified in the LMS and manufacturer recommended installation procedures, operating manuals, test sheets and maintenance schedules are also stored in the LMS. Printed copies of installation instructions will be provided for use by Contractor field installation personnel.
Materials of construction	Specifications for materials of construction are set out in Regain specification documents which include reference to relevant Australian Standards along with inspection, testing and certification requirements.
Fabrication	Regain specifications are provided to fabricators setting out requirements with regard to materials, qualification of trades people, fabrication techniques (where appropriate), inspection, testing and certification. Quality of safety critical materials and equipment is assured through separate and independent inspection and testing.
Installation	The installation schedule will show safety critical points during construction and these will be communicated to Contractor personnel. Inspection and test plan documents will set out instruction and checklists for people performing inspection functions. The Regain change management system will apply for changes (see section below).
Critical verification / safety reviews	Safety critical witness and hold points will be identified in inspection and test plans. Safety reviews will take place prior to commencement of plant construction, prior to commencement of commissioning and prior to handover to operations.
Training / qualifications	Contractors will be required to provide evidence of qualifications of personnel such as electricians who are to perform installation and/or commissioning work that require such qualification. Site inductions will provide training that specifically addresses relevant process safety issues. Regain plant operators will undertake specific training in operation of the SPL Processing Plant.
Definition of responsibilities	The people responsible for each aspect of the safety assurance system including the issues set out in table 3 and in this table 4 will be identified in the Project Construction and Commissioning Delivery Plan.

6. Construction and Commissioning Program

The proposed programs for construction and commissioning of the SPL Treatment Plant are set out in figure 3 below and summarised as follows:

1. Completion of design and preliminary works by end of February, 2020 in preparation for commencement of plant construction. The HAZOP study and Construction Safety Study (condition 16 of Development Approval MP06_0050 MOD 2) along with design risk analysis and a final design risk and plant control system review take place as part of the design program. The Emergency Plan and documentation of the Safety Management System in accordance with condition 16A of Development Approval MP06_0050 MOD 2 will also be prepared and submitted for approval during this period.
2. Construction of the plant from the beginning of February to mid-April, 2020 subject to receipt of DPE&I approvals of the HAZOP study and Construction Safety Study. A pre-construction safety review will be conducted prior to commencement of construction.
3. Commissioning of the plant following construction by the end of May, 2020 with commencement of commissioning subject to DPE&I approval of the Emergency Plan and the Safety Management System documentation. A pre-commissioning safety review will be conducted prior to commencement of commissioning and a pre-operations safety review will be conducted prior to completion of commissioning and handover to Operations.

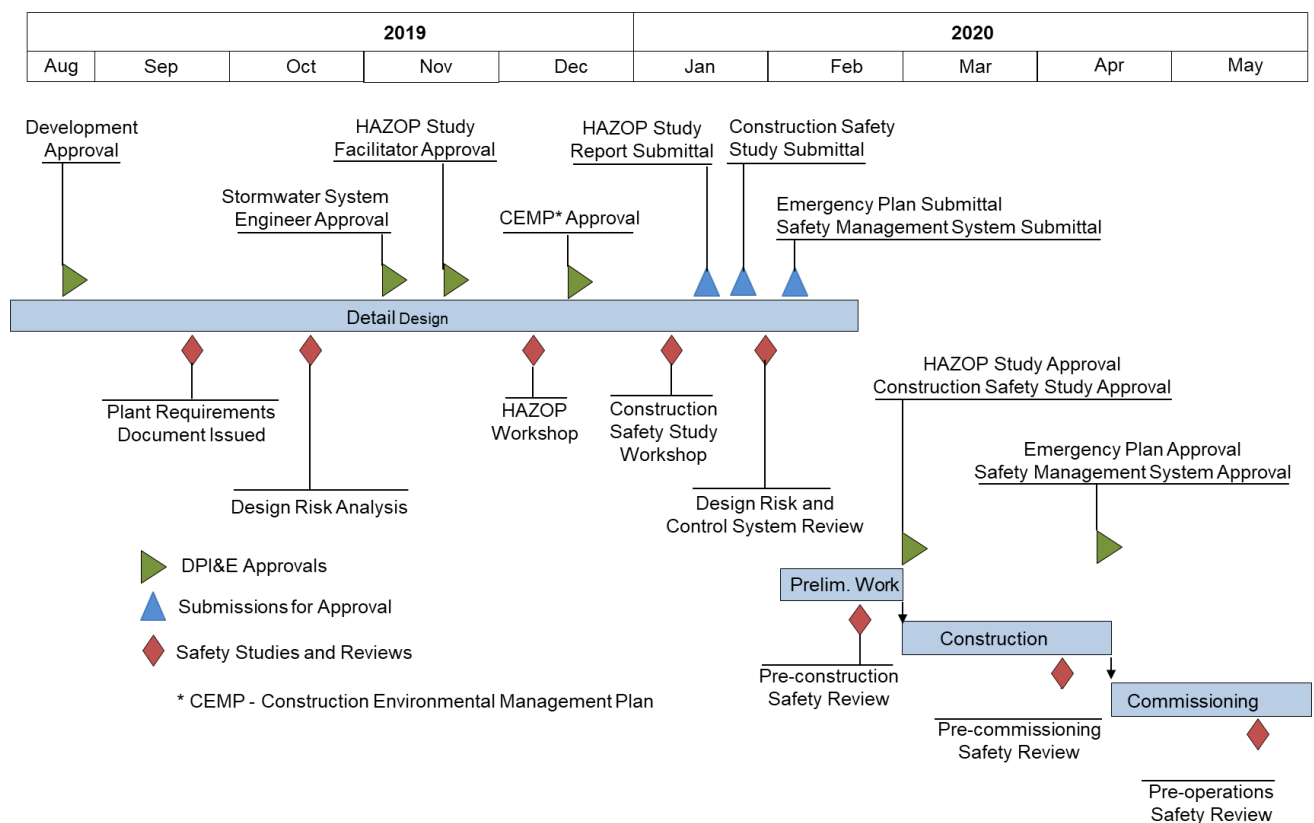


Figure 3 – Construction / Commissioning Program and Safety Related Milestones

(Please note that certain details of submissions and approvals have been omitted for clarity including the post-construction Hazard Audit. See the Project Activities Diagram in Appendix D for a complete set of submissions and approvals)

Construction of the approved SPL Treatment Plant is a relatively small construction project. It will involve the installation of approximately 150 tonnes of steel and mechanical equipment over a six-week construction period. Key construction sequencing tasks are outlined below:

- Ground truthing of underground services prior to ground excavation works
- Site preparation including construction/verification of footings and secondary plant elements
- Verification of environmental controls and stormwater system function
- Pre-construction safety review
- Delivery of critical plant elements such as thermal treatment kiln and dust collectors
- Development of crane lift plans prior to installation
- Implementation of safeguards prior to crane lifts
- Installation of kiln/tie in works, verification of safe installation and appropriate safeguards
- Inspection and testing progressively during construction prior to commissioning
- Pre-commissioning safety review
- Commissioning test run to verify plant performance
- Pre-operations safety review.

7. Management of Change During Construction and Commissioning

7.1 Regain Approach to Change Management

Regain has a well-established change management system that is administered within the LMS.

A change that presents a potential threat to important functionality typically has risks that may not be well understood and may have unpredictable outcomes. The degree of assurance required for a particular change should be proportional to the safety significance, complexity and economic impact of the proposed change and associated potential errors.

Well-executed change control for significant changes is essential when changing safety critical systems. Pressure to make rapid changes to plant and systems without a formal review process often results in unexpected failure due to factors such as unforeseen technical problems, lack of knowledge of design requirements or lack of understanding of the effects of the change. People working with Regain are assured that there is no such pressure where safety critical issues are involved.

Changes are subject to formal review and approval. Review may include the person or people who have initiated the change and the person who would authorise the change. However, review must involve one or more people who:

- Are not initiators of the proposed change
- Are not the person who would approve the proposed change
- Have knowledge of the plant or system design requirements and of potential effects of the proposed change.

Each change requires:

- Review of the requirements that have been defined associated with the area for which the change is contemplated which may include a revision of the Plant Requirements Document
- Being the subject of a formal hazard identification & risk control study
- A Change Report that is subject to review and approval
- Identification of the change, the parts of the plant and/or management systems affected by the change and all relevant documents stored and cross-referenced in the LMS.

Certain changes may require notification to regulatory authorities and modification to approvals and/or licences. If this is considered likely for a prospective change then the appropriate authority is advised as early as is practically possible.

7.2 Modification of the Project Program

If the project schedule is disrupted in a way that may affect process safety then the default position is that project schedule will be extended to accommodate the disruption. The personnel involved in this Construction Safety Study will assess any changes to the project schedule and review the safety implications in formulating a new project schedule.

7.3 Permanent Modifications of Hardware / Operational Safeguards

If problems arise during construction and commissioning that necessitate permanent modifications then these will be addressed using the Regain change management approach described above.

8. Glossary of Terms and Abbreviations

8.1 Definitions of Key Terms

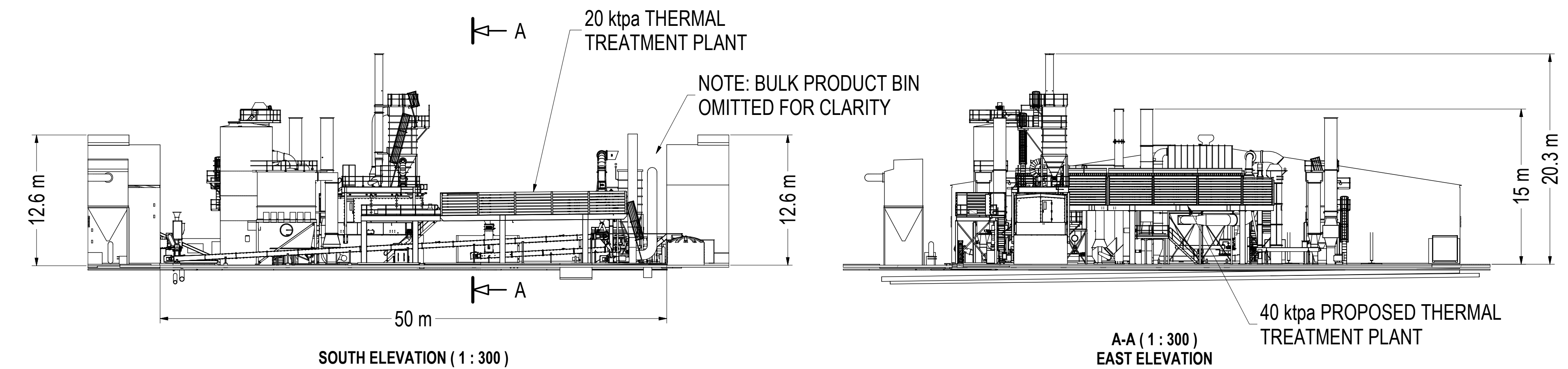
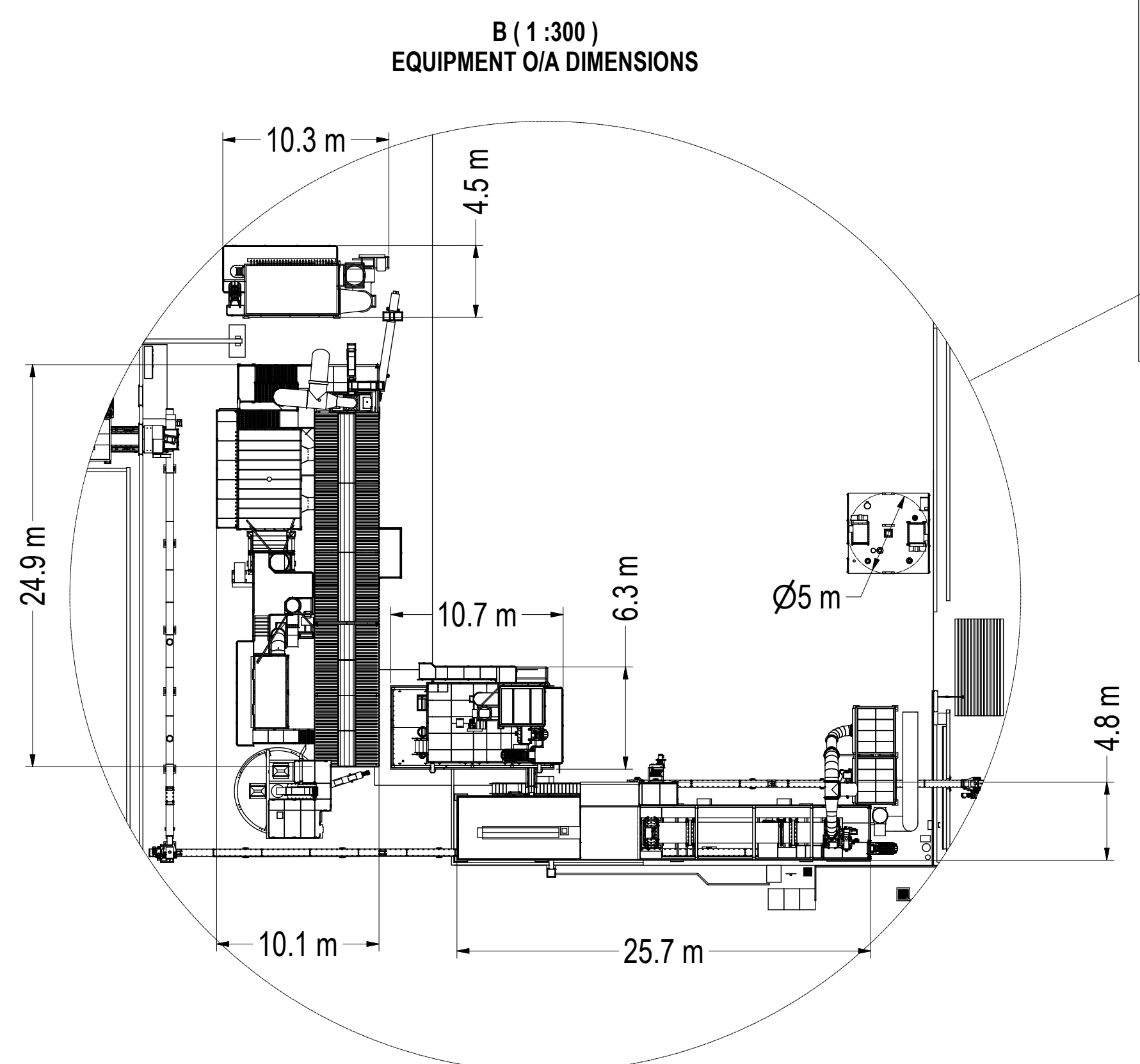
<i>Configuration Management</i>	The process of identifying and documenting the characteristics of the structures, systems and components of a process facility, and of ensuring that changes to these characteristics are properly developed, assessed, approved, issued, implemented, verified, recorded and incorporated into the facility documentation.
<i>Due Diligence</i>	Appropriate, sufficient, or proper care and attention (Oxford English Dictionary)
<i>Equipment</i>	Single parts of a plant, such as feeders, conveyors, crushers, mills, drive motors, valves, field instruments, control devices (adapted from ISO 10628:1997).
<i>Hazard</i>	A source of potential harm or damage which can cause a loss such as injury to people, damage to their health, damage to the environment, damage to equipment or bad quality production
<i>Hazard & Loss Prevention Analysis (HAZLEP)</i>	An analysis of the hazards, potential loss events and controls required to eliminate risk associated with the hazards or, if the risk cannot be eliminated, then the controls required to limit the extent of damage or harm if a loss event actually occurs
<i>Hazard & Operability (HAZOP) Study</i>	An analysis of the hazards and operability of a process plant using a group of people with knowledge of the plant. A HAZOP identifies hazards and defines controls required to eliminate or mitigate risk.
<i>Hydrolysis</i>	Chemical decomposition due to reaction with water.
<i>Lifecycle management</i>	Process of managing the lifecycle of objects. A typical object lifecycle involves stages such as initiation, preparation (including design), verification, review and release for use (approval).
<i>Loss</i>	Any harm or damage including injury to people, harm to the environment, damage, breach of law, disruption to production or decrease in financial value
<i>Loss event</i>	An event that could cause loss. The occurrence of a loss of control.
<i>Object</i>	An entity treated in a process of development, implementation, usage and disposal (IEC 8134.6-1 2009). An object is a useful identifiable element – such things such as documents, equipment items, process plant, parts, requirements and a piece of software.
<i>Plant</i>	The fixtures, implements, machinery and apparatus used in carrying out any industrial process (Shorter Oxford English Dictionary).
<i>Plant Requirements Documents</i>	Documents that set out the requirements of the processing technology and plant addressing key safety, environmental, design, operations and maintenance matters along with a summary description of the key plant equipment.
<i>Practicable</i>	Capable of being put into practice, carried out in action, effected, accomplished, or done; feasible (Oxford English Dictionary)
<i>Precaution</i>	A measure taken beforehand to ward off evil, or to ensure a good result (Oxford English Dictionary)
<i>Process</i>	Sequence of chemical, physical or biological operations for the conversion, transport or storage of materials or energy (ISO 10628:1997).
<i>Process plant</i>	Structures and equipment necessary for performing a process.
<i>Process Control</i>	Monitoring, controlling and protecting process and equipment.
<i>Process Safety</i>	The protection of people and property from episodic and catastrophic incidents that may result from unplanned or unexpected deviations in process conditions. (Guidelines for Auditing Process Safety Management Systems, 2nd ed. [New York: Center for Chemical Process Safety, 2011], xxvi)
<i>Requirement</i>	A statement of the particular needs to be satisfied, or essential characteristics that are required of a product material, method, process, service, system, or body of work.
<i>Review</i>	Look over with a view to correction or improvement and ensuring that significant opportunities, issues and risks have been addressed
<i>Specification</i>	A document setting out a particular scope, reference documents and a set of associated requirements.
<i>System</i>	A set of interrelated objects considered in a defined context as a whole and separated from their environment (IEC 8134.6-1 2009).
<i>Thermal Decomposition</i>	Chemical decomposition due to heat.

8.2 Acronyms and Abbreviations

<i>FAT</i>	Factory Acceptance Test
<i>HAZLEP</i>	Hazard & Loss Prevention Analysis
<i>HAZOP</i>	Hazard & Operability (Study)
<i>HIPAP 7</i>	NSW Department of Planning's Hazardous Industry Planning Advisory Paper No. 7, "Construction Safety Study Guidelines"
<i>HIPAP 8</i>	NSW Department of Planning's Hazardous Industry Planning Advisory Paper No. 8, "HAZOP Guidelines"
<i>LMS</i>	Lifecycle Management System
<i>P&ID</i>	Process and Instrumentation Diagram
<i>PLC</i>	Programmable Logic Controller
<i>RMS</i>	Regain Management System
<i>SAT</i>	Site Acceptance Test
<i>SCADA</i>	Supervisory Control and Data Acquisition System
<i>SPL</i>	Spent Potlining

Appendix A – Site Layout Drawing

Regain Drawing No 116TD158

[illegible]

Appendix B Study Team and Synopsis of Experience

Name and Role	Project Accountabilities	
Bernie Cooper Regain Managing Director	Overall plant performance and safety Ensuring required resources are available and that the recommendations of this study are implemented.	<p>Bernie Cooper has 40 years of experience in industrial organisations. He has been President and Managing Director with Regain since 2011.</p> <p>From 2000 to 2010, Bernie was Chief Executive Officer of an Australian based technical asset management and maintenance company jointly owned by Siemens AG and Leighton Holdings Limited. Prior to 2000, he worked with the Bechtel engineering construction organisation in corporate roles and on a range of development projects including primary aluminium smelters.</p> <p>Bernie has qualifications in engineering and business administration. He is a Fellow of the Institution of Engineers Australia (EA), has EngExec accreditation from EA and is certified on the National Engineering Register. He is also a member of the Australian Institute of Company Directors.</p>
John Cooper Operations Support Manager	Validation that plant is fit for purpose for operations Handover of plant to operations Training of operators	<p>John Cooper has thirty years of experience in industrial work involving mineral and chemical processing. He has worked for Regain since 2002 and held Operations Manager roles for Regain sites at the Tomago smelter, Kurri Kurri Smelter, Point Henry (Vic) smelter and Portland (Vic) smelter. He has also had management responsibility for delivery of construction and commissioning of SPL processing plants.</p>
Kevin Cooper Development Manager and NSW Regional Manager	Liaison with DPIE, NSW EPA and specialised consultants Ensuring requirements of Development Approval MP06_0050 and MOD 2 are incorporated into the plant construction and operations	<p>Kevin Cooper has more than thirty years of experience in industrial work involving mineral and chemical processing. He managed the establishment of the SPL demonstration plant at Tomago in 2001. He has held Operations Manager roles for Regain sites at the Tomago smelter and Kurri Kurri Smelter.</p> <p>Kevin has been NSW Regional Manager for Regain since 2002 and has managed the engagement with government regulators, communities, consultants and clients through that period. He is also responsible for managing the engagement with the international cement companies that use the products from the SPL Processing Facility.</p>
Andrew Dinning Mechanical Engineer	Documentation of process and mechanical design of the plant	<p>Andrew Dinning has 35 years of experience in engineering and maintenance of process plants. He has been the principal of an Engineering consultancy since 1998 with a wide range of assignments in many industries including building products, paper and mining. He has been involved with Regain SPL processing plants since 2007. Prior to 1998 Andrew was project manager and engineering manager for Laminex, a building products company.</p> <p>Andrew is qualified as a mechanical engineer and is a member of the Institution of Engineers Australia.</p>
Glenn Mullen Project Manager	Delivery of the project including construction and commissioning of the plant	<p>Glenn Mullen has 40 years of experience in design and construction of industrial plant and electrical and telecommunications infrastructure. He has been part of the Regain group since 2015. From 1999 to 2015 he worked at senior management levels in company jointly owned by Siemens AG and Leighton Holdings Limited providing design and construction for electrical and telecommunications infrastructure. Prior to 1999 he worked with Siemens on industrial projects and electrical infrastructure construction.</p>

Appendix C - NSW Department of Planning, Industry and Environment
(DPIE) Development Approval MP06_0050 MOD 2

9 pages

Modification of Minister's Approval

Section 75W of the *Environmental Planning and Assessment Act 1979*

As delegate for the Minister for Planning and Public Spaces, under the Instrument of Delegation executed on 11 October 2017, I approve the modification of the project approval referred to in Schedule 1, subject to the conditions outlined in Schedule 2.



Kelly McNicol
Acting Director
Industry Assessments

Sydney 22 AUGUST 2019

File: OBJ17/15267

SCHEDULE 1

Development Approval:	MP06_0050 (granted by the then Minister for Planning on 7 August 2009)
For the following:	Spent Potlining Recycling Facility at Tomago Road, Tomago
Proponent:	Regain Services Pty Ltd
Approval Authority:	Minister for Planning and Public Spaces
Land:	Lot 3 in DP 808004
Modification:	MP 06_0050 MOD 2: increase the processing capacity of SPL from 20,000 tonnes per year to 60,000 tonnes per year and the installation and operation of an additional thermal treatment plant

SCHEDULE 2

This approval is modified as follows:

In Definitions:

1. Delete the definitions for DECC, Department, Minister, Project, Site, Thermal Treatment Plant and insert the following definitions in alphabetical order:

Construction	the demolition and removal of buildings or works, the carrying out of works for the purpose of the Project, including the installation of an additional thermal treatment plant, bulk earthworks, and erection of buildings and other infrastructure permitted by this approval
Department	the Department of Planning, Industry and Environment
EPA	NSW Environment Protection Authority
FRNSW	Fire and Rescue NSW
Minister	Minister for Planning and Public Spaces or delegate
MOD 1	Supporting documentation titled Spent Potliner (SPL) Recycling Facility at Tomago Aluminium Smelter – 75W Modification, dated 19 September 2016,

prepared by AECOM Australia Pty Ltd and Response to Submissions titled Spent Potliner (SPL) Recycling Facility at Tomago Aluminium Smelter – S75W Modification, dated 19 October 2016 prepared by AECOM Australia Pty Ltd

MOD 2

EA titled Environmental Assessment: Capacity Increase at the Regain Spent Potlining Facility, Tomago, dated 13 November 2018 prepared by AECOM Australia Pty Ltd and Response to Submissions titled Response to Submissions Report: Environmental Assessment-Capacity Increase at the Regain Spent Potlining Facility, Tomago, dated 29 March 2019 prepared by AECOM Australia Pty Ltd and supplementary information titled Regain Spent Potlining Treatment Facility – Response to Submissions MP06-0050 Modification 2: NSW EPA letter dated 24 May 2019 prepared by AECOM Australia Pty Ltd

Project	the Project as described in the EA, MOD 1 and MOD 2
Planning Secretary	Planning Secretary of the Department of Planning, Industry and Environment or delegate
Site	the land referred to in Schedule 1
Stage 1 construction	the carrying out of works for the purpose of the Project, as identified in MOD 2 including the construction and installation of the 40,000 tonne per year thermal treatment plant and stormwater controls required to receive and process 60,000 tonnes per year of SPL
Stage 2 construction	the carrying out of works for the purpose of the Project, as identified in MOD 2 including the construction and installation of the drying plant, fine grinding feed bin, fine grinding plant and bulk product bin.
Thermal treatment	involves the heat treatment process which would destroy the cyanide and neutralise the flammable gas hazard associated with SPL while retaining carbon, fluorides, and other inorganic compounds

In Schedule 2: Administrative Conditions

2. Delete all references to "Director-General" and replace with "Planning Secretary".

Terms of Approval

3. Delete and replace Schedule 2 Condition 2 with the following:
 2. The Proponent must carry out the Project generally in accordance with the:
 - (a) Project Application 06_0050;
 - (b) EA;
 - (c) MOD 1;
 - (d) MOD 2;
 - (e) Project layout plans and drawings listed in Appendix A;
 - (f) statement of commitments listed in MOD 2; and
 - (g) conditions of this approval.

Limits on Approval

4. Delete and replace Schedule 2 Condition 5 with the following:
 5. The Proponent must not receive or process more than 60,000 tonnes of SPL per year.

In Schedule 3: Specific Environmental Conditions

SOIL AND WATER

5. Insert new heading and new Condition 15A, immediately after Schedule 3 Condition 15. as follows:

Stormwater Management System

15A. Prior to the commencement of Stage 1 operations, the Proponent must design, install and operate a stormwater management system (SMS) for the Project. The SMS must:

- (a) be designed by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Planning Secretary;
- (b) be in accordance with the Project as modified by MOD 2 and the plans at Appendix A of this approval;
- (c) be in accordance with applicable Australian Standards; and
- (d) ensure that the system capacity has been designed in accordance with Australian Rainfall and Runoff (Engineers Australia, 2016) and Managing Urban Stormwater: Council Handbook (EPA, 1997) guidelines.

6. Insert new Condition 15B immediately after Schedule 3 Condition 15A as follows:

15B. Prior to the commencement of Stage 1 operations, works-as-executed drawings signed by a registered surveyor must be submitted to the certifying authority demonstrating the stormwater drainage and finished ground levels have been constructed as approved.

7. Insert new Condition 15C immediately after Schedule 3 Condition 15B as follows:

15C. The surface water management system must be operated and maintained for the duration of the Project.

HAZARDS

8. Delete and replace Schedule 3 Condition 16 with the following:

Pre-construction

16. At least one month prior to the commencement of Stage 1 construction of the Project as modified by MOD 2 (except for construction of those preliminary works that are outside the scope of the hazard studies), or within such further period as the Planning Secretary may agree, the Proponent must prepare and submit for the approval of the Planning Secretary the studies set out under subsections 16(a) to 16(c) below (the pre-construction studies). Construction, other than the preliminary works that are outside the scope of the hazards studies must not commence until approval has been given by the Planning Secretary.

- (a) A Hazard and Operability Study for the Project inclusive of MOD 2, chaired by a qualified person, independent of the Project, approved by the Planning Secretary prior to the commencement of the study. The study shall be carried out in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 8, 'HAZOP Guidelines'. The study report must be accompanied by a program for the implementation of all recommendations made in the report. If the Proponent intends to defer the implementation of a recommendation, reasons must be documented. The study must include and not be limited to concurrent operation of the new and existing thermal treatment plants.
- (b) Construction Safety Study prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 7 'Construction Safety'.

9. Insert new heading and new Condition 16A, immediately after Schedule 3 Condition 16 as follows:

Pre-commissioning

16A. The Proponent must develop and implement the plans and systems set out under subsections 16A(a) and 16A(b) below. No later than two months prior to the commencement of commissioning of the Project, or within such further period as the Planning Secretary may agree, the Proponent must submit for the approval of the Planning Secretary documentation describing those plans and systems. Commissioning must not commence until approval has been given by the Planning Secretary.

- (a) A comprehensive Emergency Plan and detailed emergency procedures for the proposal. The Emergency Plan shall include consideration of the safety of all people outside of the Project who may be at risk from the Project. The plan shall be prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 1, 'Emergency Planning'.
- (b) A document setting out a comprehensive Safety Management System, covering all on-site operations and associated transport activities involving hazardous materials. The document shall clearly specify all safety related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to the procedures. Records shall be kept on-site and shall be available for inspection by the Planning Secretary upon request. The Safety Management System shall be developed in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 9, 'Safety Management'.

10. Insert new heading and new Condition 16B, immediately after Schedule 3 Condition 16A as follows:

Ongoing - Hazard Audit

- 16B. Within 12 months the commencement of stage 1 operations of the Project and every five years thereafter, or at such intervals as the Planning Secretary may agree, the Proponent shall carry out a comprehensive Hazard Audit of the Project and within one month of each audit submit a report to the satisfaction of the Planning Secretary. The Hazard Audit must:
- (a) be carried out at the Proponent expense by a qualified person or team, independent of the Project, approved by the Planning Secretary prior to commencement of the audit. Hazard Audits shall be carried out in accordance with the Department's *Hazardous Industry Planning Advisory Paper No. 5, 'Hazard Audit'*.
 - (b) include a review of the site Safety Management System and a review of all entries made in the incident register since the previous audit.
 - (c) be accompanied by a program for the implementation of all recommendations made in the audit report. If the Proponent intends to defer the implementation of a recommendation, reasons must be documented.

11. Insert new heading and new Condition 16C, immediately after Schedule 3 Condition 16B. as follows:

Further Requirements

- 16C. The Proponent must comply with all reasonable requirements of the Planning Secretary in respect of the implementation of any measures arising from the reports submitted in respect of Conditions 16, 16A and 16B inclusive, within such time as the Planning Secretary may agree.

AIR

Air Quality Monitoring and Criteria

12. Delete and replace Schedule 3 Condition 18 with the following:

18. The Proponent must install and operate all SPL plant equipment in line with best practice to ensure the Project complies with all load limits, air quality criteria and air quality monitoring requirements as specified in the EPL for the site.

13. Insert new heading and new Condition 18A, immediately after Schedule 3 Condition 18, as follows:

Air Quality Management Plan

- 18A. Prior to the commencement of Stage 1 operations, the Proponent must prepare an Air Quality Management Plan (AQMP) to the satisfaction of the Planning Secretary. The plan must form part of the OEMP required by Condition 26D and be prepared in accordance with Condition 26. The AQMP must:
- (a) be prepared by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Planning Secretary;
 - (b) detail and rank all emissions from all sources of the Project, including particulate emissions;
 - (c) describe a program that is capable of evaluating the performance of the operation and determining compliance with key performance indicators;
 - (d) identify the control measures that will be implemented for each emission source; and
 - (e) nominate the following for each of the proposed controls:
 - (i) key performance indicator;
 - (ii) monitoring method;
 - (iii) location, frequency and duration of monitoring;
 - (iv) record keeping;
 - (v) complaints register;
 - (vi) response procedures; and
 - (vii) compliance monitoring.

14. Insert a new Condition 18B, immediately after Schedule 2 Condition 18A, as follows:

- 18B. The Proponent must:

- (a) not commence operations until the AQMP required by Condition 18A is approved by the Planning Secretary; and
- (b) implement the most recent version of the AQMP approved by the Planning Secretary for the duration of the Project.

15. Insert a new heading and delete and replace Condition 19 with the following:

Post Commissioning Air Emission Verification Report

19. Within 12 months of commissioning Stage 1 operations and Stage 2 operations, the Proponent must submit a post commissioning air emission verification report (AEVR) to the satisfaction of the Planning Secretary (the report). The AEVR must:
- (a) must be prepared by a suitably qualified and experienced person(s);
 - (b) include all emission test and analytical results from post commissioning emission monitoring required to be undertaken by the EPL;
 - (c) compare the results of the post commissioning monitoring against emission limits contained in the EPL for the relevant emission points where the comparison shows monitored discharge concentrations higher than the EPL limits;
 - (d) must identify mitigation measures to achieve the EPL emission limits; and
 - (e) include details of any amendments to the EPL as a result of the EPA's review of the AEVR.

In SCHEDULE 4: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

16. Delete and replace heading and delete and replace Schedule 4 Condition 26 with the following:

ENVIRONMENTAL MANAGEMENT

Management Plan Requirements

26. Management plans required under this approval must be prepared in accordance with relevant guidelines, and include:
- (a) details of:
 - (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - (ii) any relevant limits or performance measures and criteria; and
 - (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (b) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;
 - (c) a program to monitor and report on the:
 - (i) impacts and environmental performance of the development; and
 - (ii) effectiveness of the management measures set out pursuant to paragraph (b) above;
 - (d) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
 - (e) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (f) a protocol for managing and reporting any:
 - (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);
 - (ii) complaint;
 - (iii) failure to comply with statutory requirements; and
 - (g) a protocol for periodic review of the plan.

Note: the Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans

17. Insert a new heading and new Condition 26A, immediately after Schedule 4 Condition 26, as follows:

Construction Environmental Management Plan

- 26A. The Proponent must prepare a Construction Environmental Management Plan (CEMP) in accordance with the requirements of Condition 26 and to the satisfaction of the Planning Secretary.

18. Insert a new Condition 26B, immediately after Schedule 4 Condition 26A, as follows:

26B. The Proponent must:

- (a) not commence construction of the development until the CEMP is approved by the Planning Secretary; and
- (b) carry out the construction of the Project in accordance with the CEMP approved by the Planning Secretary and as revised and approved by the Planning Secretary from time to time.

19. Insert a new heading and new Condition 26C, immediately after Condition 26B, as follows:

Operational Environmental Management Plan

26C. The Proponent must prepare an Operational Environmental Management Plan (OEMP) in accordance with the requirements of Schedule 4 Condition 26 and to the satisfaction of the Planning Secretary.

20. Insert new Condition 26D, immediately after Schedule 4 Condition 26C, as follows:

26D. As part of the OEMP required under Condition 26C. of this approval, the Proponent must include the following:

- (a) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the Project;
- (b) describe the procedures that would be implemented to:
 - (i) keep the local community and relevant agencies informed about the operation and environmental performance of the Project;
 - (ii) receive, handle, respond to, and record complaints;
 - (iii) resolve any disputes that may arise;
 - (iv) respond to any non-compliance;
 - (v) respond to emergencies; and
- (c) include the following environmental management plans:
 - (i) Air Quality Management Plan (see Condition 18A).

21. Insert new Condition 26E, immediately after Schedule 4 Condition 26D, as follows:

26E. The Proponent must:

- (a) not commence operation until the OEMP is approved by the Planning Secretary; and
- (b) operate the Project in accordance with the OEMP approved by the Planning Secretary (and as revised and approved by the Planning Secretary from time to time).

22. Insert a new heading and new Condition 26F, immediately after Condition 26E, as follows:

REVISION OF STRATEGIES, PLANS AND PROGRAMS

26F. Within three months of:

- (a) the submission of a Compliance Report under Condition 28C;
- (b) the submission of an incident report under Condition 27;
- (c) the submission of an Independent Audit under Condition 29;
- (d) the approval of any modification of the conditions of this approval; or
- (e) the issue of a direction of the Planning Secretary under Condition 26I which requires a review.

23. Insert new Condition 26G, immediately after Condition 26F, as follows:

26G. The strategies, plans and programs required under this approval must be reviewed, and the Department must be notified in writing that a review is being carried out.

24. Insert new Condition 26H, immediately after Condition 26G, as follows:

26H. If necessary to either improve the environmental performance of the Project, cater for a modification or comply with a direction, the strategies, plans and programs required under this approval must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the Project.:

REPORTING AND AUDITING

25. Insert a new heading and delete and replace Condition 27 with the following:

Incident Notification, Reporting and Response

27. The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident. The notification must identify the Project (including the Project application number and the name of the Project if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix B

26. Insert a new heading and delete and replace Condition 28 with the following:

Non-Compliance Notification

28. The Department must be notified in writing to compliance@planning.nsw.gov.au within seven days after the Proponent becomes aware of any non-compliance.

27. Insert new condition 28A, immediately after Condition 28, as follows:

- 28A. A non-compliance notification must identify the Project and the application number for it, set out the condition of approval that the Project is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

28. Insert new condition 28B, immediately after Condition 28A, as follows:

- 28B. A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

29. Insert a new heading and new condition 28C, immediately after Condition 28B, as follows:

Compliance Reporting

- 28C. No later than six weeks before the date notified for the commencement of operations as described in Mod 2 a Compliance Monitoring and Reporting Program prepared in accordance with the Compliance Reporting Post Approval Requirements (Department 2018) must be submitted to the Department.

30. Insert new condition 28D, immediately after Condition 28C, as follows:

- 28D. Compliance Reports of the Project must be carried out in accordance with the Compliance Reporting Post Approval Requirements (Department 2018).

31. Insert new condition 28E, immediately after Condition 28D, as follows:

- 28E. The Proponent must make each Compliance Report publicly available no later than 60 days after submitting it to the Department and notify the Department in writing at least seven days before this is done.

32. Insert a new heading and delete and replace Condition 29 with the following:

Independent Audit

29. No later than four weeks before the date notified for the commencement of operations as described in MOD 2 an Independent Audit Program prepared in accordance with the Independent Audit Post Approval Requirements (Department 2018) must be submitted to the Department.

33. Delete and replace Condition 30 with the following:

30. Independent Audits of the Project must be carried out in accordance with:
- (a) the Independent Audit Program submitted to the Department under Condition 29 of this approval; and
 - (b) the requirements for an Independent Audit Methodology and Independent Audit Report in the Independent Audit Post Approval Requirements (Department 2018).

34. Insert new Condition 31, as follows:

31. In accordance with the specific requirements in the Independent Audit Post Approval Requirements (Department 2018), the Proponent must:
- (a) review and respond to each Independent Audit Report prepared under Condition 30 of this approval;
 - (b) submit the response to the Department; and
 - (c) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Department and notify the Department in writing at least seven days before this is done.

35. Insert new heading and new Condition 32, as follows:

Monitoring and Environmental Audits

32. Any condition of this approval that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance reporting and independent auditing.

***Note:** For the purposes of this condition, as set out in the EP&A Act, "monitoring" is monitoring of the Project to provide data on compliance with the approval or on the environmental impact of the Project, and an "environmental audit" is a periodic or particular documented evaluation of the Project to provide information on compliance with the approval or the environmental management or impact of the Project.*

36. Insert new heading and new Condition 33 as follows:

ACCESS TO INFORMATION

33. At least 48 hours before the commencement of construction until the completion of all works under this approval, the Proponent must:
- (a) make the following information and documents (as they are obtained or approved) publicly available on its website:
 - (i) the documents referred to in Schedule 2 Condition 2 of this approval;
 - (ii) all current statutory approvals for the Project;
 - (iii) all approved strategies, plans and programs required under the conditions of this approval;
 - (iv) the proposed staging plans for the Project if the construction, operation or decommissioning of the Project is to be staged;
 - (v) regular reporting on the environmental performance of the Project in accordance with the reporting requirements in any plans or programs approved under the conditions of this approval;
 - (vi) a comprehensive summary of the monitoring results of the Project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
 - (vii) a summary of the current stage and progress of the Project;
 - (viii) contact details to enquire about the Project or to make a complaint;
 - (ix) a complaints register, updated monthly;
 - (x) the Compliance Report of the Project;
 - (xi) audit reports prepared as part of any Independent Audit of the Project and the Proponent's response to the recommendations in any audit report;
 - (xii) any other matter required by the Planning Secretary; and
 - (b) keep such information up to date, to the satisfaction of the Planning Secretary.

Appendix

34. Delete Appendix A and replace as follows:

APPENDIX A

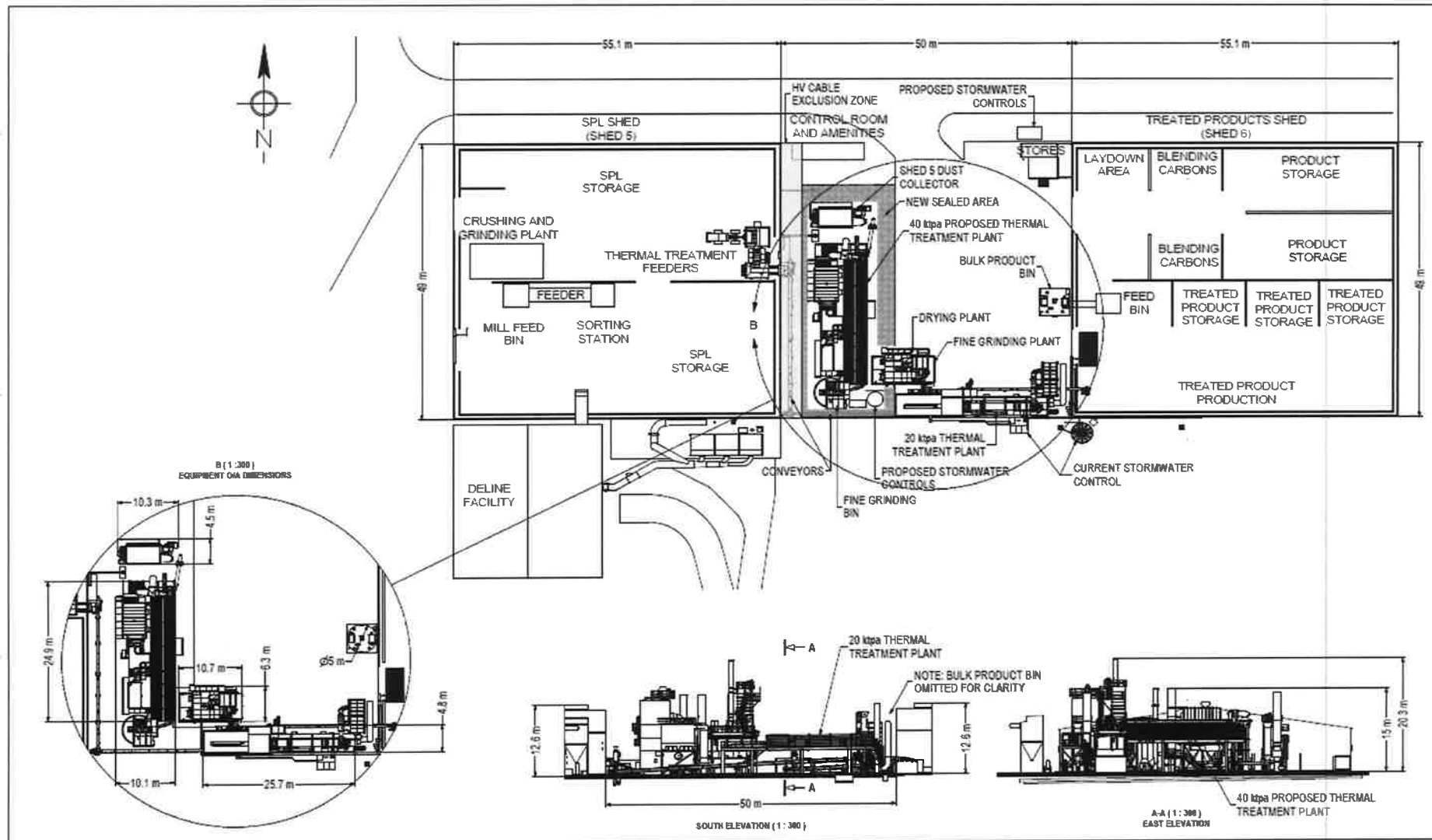


Figure 1: Conceptual Site Layout

35. Insert new heading and Appendix B as follows:

APPENDIX B - INCIDENT NOTIFICATION AND REPORTING REQUIREMENTS

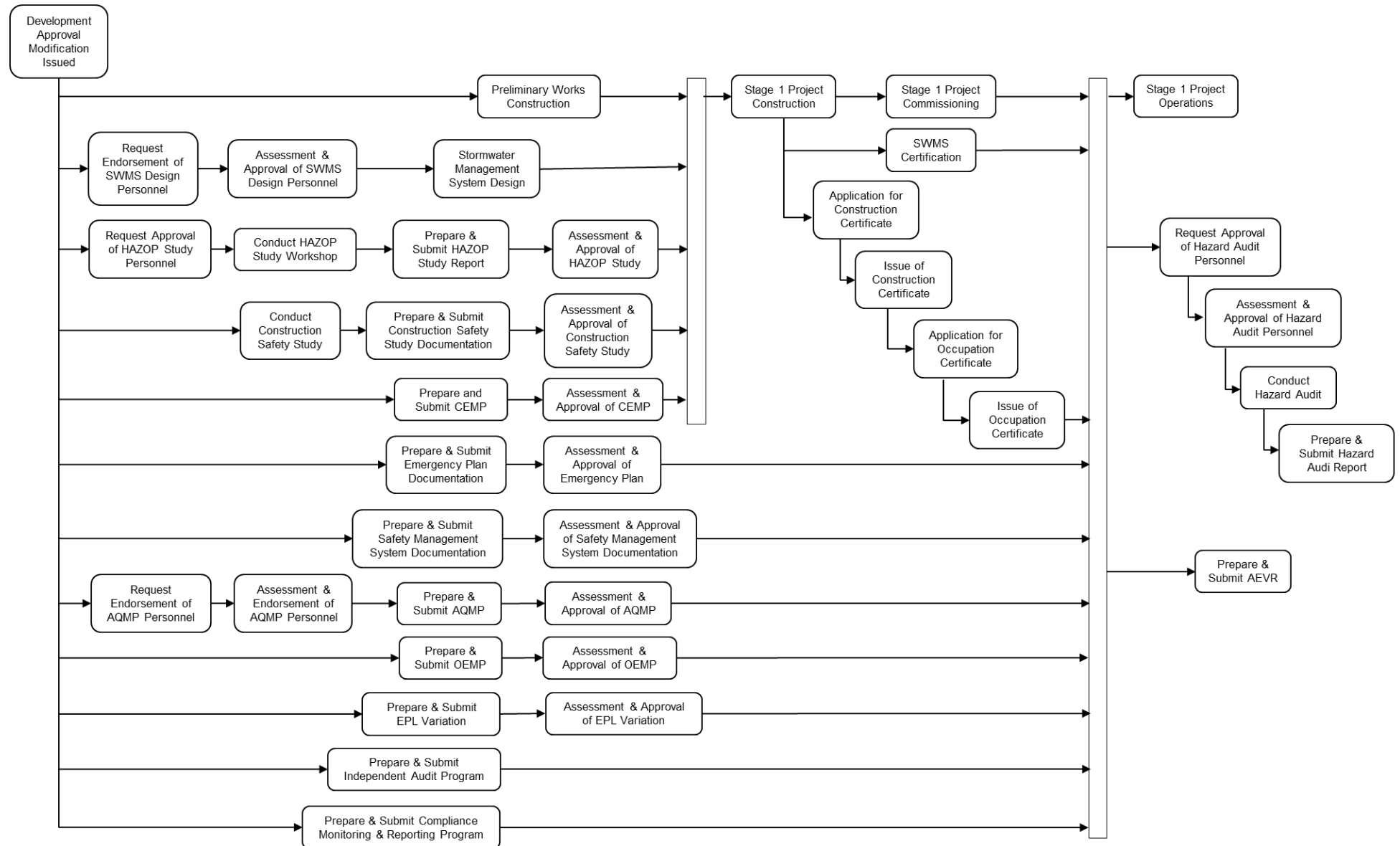
WRITTEN INCIDENT NOTIFICATION REQUIREMENTS

1. A written incident notification addressing the requirements set out below must be emailed to the Department at the following address: compliance@planning.nsw.gov.au within seven days after the Applicant becomes aware of an incident. Notification is required to be given under this condition even if the Applicant fails to give the notification required under condition 27 or, having given such notification, subsequently forms the view that an incident has not occurred.
2. Written notification of an incident must:
 - a. identify the development and application number;
 - b. provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
 - c. identify how the incident was detected;
 - d. identify when the applicant became aware of the incident;
 - e. identify any actual or potential non-compliance with conditions of consent;
 - f. describe what immediate steps were taken in relation to the incident;
 - g. identify further action(s) that will be taken in relation to the incident; and
 - h. identify a project contact for further communication regarding the incident.

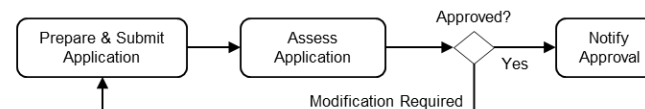
INCIDENT REPORT REQUIREMENTS

3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Applicant must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.
4. The Incident Report must include:
 - a. a summary of the incident;
 - b. outcomes of an incident investigation, including identification of the cause of the incident;
 - c. details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
 - d. details of any communication with other stakeholders regarding the incident.

Appendix D – Project Activity Flow Diagram



Expansion of Typical Submission, Assessment and Approval Process



Acronyms

AEVR – Air Emission Verification Report
 AQMP – Air Quality Management Plan
 EPL – Environment Protection Licence
 CEMP – Construction Environmental Safety Plan
 HAZOP – Hazard & Operability
 OEMP – Operational Environmental Management Plan
 SWMS – Stormwater Management System