Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6952/2024/1
Works approval holder	Australian Gold Reagents Pty Ltd
ACN	009 140 121
Registered business address	Level 14, Tower 2 Brookfield Place 123 St Georges Terrace PERTH WA 6000
DWER file number	DER2024/00361
Duration	01/04/2025 to 31/03/2028
Date of issue	01/04/2025
Premises details	Australian Gold Reagents Lot 20 Kwinana Beach Road KWINANA BEACH WA 6167 Legal description - Part of Lot 20 on Diagram 78086 Certificate of Title Volume 1918 Folio 222 As indicated by the maps in Schedule 1

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	Assessed production capacity
Category 31: Chemical manufacturing	170,000 tonnes per annual period

This works approval is granted to the works approval holder, subject to the attached conditions, on 1 April 2025, by:

Michael Greenslade
Digitally signed by Michael Greenslade
Date: 2025.04.01 17:19:50 +08'00'

MANAGER, PROCESS INDUSTRIES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Works approval history

Date	Reference number	Summary of changes
01/04/2025	W6952/2024/1	Works approval granted.

Interpretation

In this works approval:

(a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a condition, each row in a table constitutes a separate condition;

(d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:

(i) if dated, refers to that particular version; and

(ii) if not dated, refers to the latest version and therefore may be subject to change over time;

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and

(f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

Works approval conditions

The works approval holder must ensure that the following conditions are complied with:

Construction phase

Infrastructure and equipment

1. The works approval holder must:

(a) construct and/or install the infrastructure and/or equipment;

(b) in accordance with the corresponding design and construction / installation requirements; and

(c) at the corresponding infrastructure location

as set out in Table 1.

Table 1: Design and construction / installation requirements

	Infrastructure/ component	Design and construction / installation requirements	Infrastructure location
Sodium Cyanide Plant 1 (SCP1)			
1.	Modifications to gas mixing infrastructure	a) 3-stage HEPA air filter to be installed at the inlet to the air blowers for air-stream filtration; b) Natural gas filters and ammonia filters must be upgraded to provide capacity for the following expansion of flow: i. Natural gas filter must have maximum flow rate of 6,500 Nm^3/hr; and ii. Ammonia filter must have maximum flow rate of 6,500 Nm^3/hr; c) The auxiliary/ mixed gas filter to be replaced with a fully welded pipe spool rated for pressurised operation; and d) The casing on the air heater must be replaced to be rated for pressurised operation.	Within SCP1 plant, as depicted in Figure 4, Schedule 1
2.	Modifications to steam drum	a) SCP1 steam drum must be elevated by 6 m on a new pre-assembled platform established on top of the existing steam drum platform; and b) Waste gas stack must be raised by at least 6 m and remain compliant with American Petroleum Institute (API) standard 521 (Pressure-Relieving and Depressurizing Systems).	Within SCP1 plant, as depicted in Figure 4, Schedule 1
3.	Reactor modifications	a) Replacement of flanged reactor outlet pipework with welded pipe spool to minimise flanged connections; b) Installation of automatic ignitors; c) Re-routing of bursting disc discharge lines; d) Cyanide reactors must be rated for 30-50 kPa positive pressure; and e) Hydrogen cyanide (HCN) gas detectors to be installed in the vicinity of the reactors.	Within SCP1 plant, as depicted in Figure 4, Schedule 1

4.	Modifications to absorption tower and associated infrastructure	a) Internal packing of the SCP1 absorption tower to be optimised to improve production capacity and mass transfer; b) Waste gas separator to be resized to match increased production capacity; c) Caustic feed pump capacity increased to meet expansion case flow; and d) Existing exchanger on the caustic preheater to be replaced with a new larger exchanger to accommodate increased flow.	Within SCP1 plant, as depicted in Figure 4, Schedule 1
5.	Upgrades to main blower system	a) The existing air boost fan on SCP1 must be replaced with two new pressurised blowers with capacity of up to 17,000 Nm^3/hr each when operating in tandem, providing a combined air flow of 34,000 Nm^3/hr; b) Air intake to be located 12 m above ground level; c) Inlet silencers to be installed on blower inlet; d) Installed with discharge silencers; and e) Installed with acoustic enclosures.	Within SCP1 plant, as depicted in Figure 4, Schedule 1
Sodium Cyanide Solids (SCS) plant			
6.	Batch evaporators	Mist eliminators must be installed on the existing ductwork of the evaporators to capture cyanide in the evaporation stream.	Within SCS plant, as depicted in Figure 5, Schedule 1
7.	Scrubber system - Packed bed scrubber modification - New ammonia scrubber package	a) Existing packed bed scrubber must: i. Have new/upgraded packing installed; ii. sodium hydroxide (NaOH) dosed for pH control; and iii. have a chevron type mist eliminator installed to replace the existing mist eliminator; b) A new ammonia scrubber package including an ammonia scrubber column, recirculation pump, heat exchangers, and chilled water package must be installed with the following requirements: i. Must be a vertical counter-current column; ii. Must contain two packed beds each 2m in height; and iii. A demister pad must be installed in the top section of the ammonia scrubber column above the top bed.	Within SCS plant, as depicted in Figure 5, Schedule 1
8.	Supporting infrastructure	Replacement/installation of vapour condensate pumps, filtrate pump and filtrate cooler.	Within SCS plant, as depicted in Figure 5, Schedule 1

Wastewater treatment system (WWTS)			
9.	New process reverse osmosis (RO) plant	a) Design production of: i. 11 m^3/hr feed rate; ii. 8.55 m^3/hr of permeate; and iii. 1.45 m^3/hr of concentrate b) Includes the installation of: i. Filters for the removal of particulates; ii. 6 x feed/interstage tanks suitable for supplying feed to each RO stage (30 – 50 m^3 in volume each); iii. Clean in Place (CIP) circulation tank (4kL) and pump, including storage of citric acid c) To be located within a sealed concrete bunded hardstand; d) Tanks to be fitted with level transmitters and/or overflow switches; e) Have a dedicated sump and pump suitable for managing spills and rainwater; and f) Be designed to AS 4452 -1997 (The storage and Handling of Toxic Substances).	As depicted in Figure 6, Schedule 1
10.	New polishing RO plant, including:	a) Design production of: i. 14 m3/hr federate; ii. 11 m3/hr of permeate; iii. Balance to concentrate; b) Includes the installation of: i. Filters for the removal of particulates; ii. 4 x feed/interstage tanks suitable for supplying feed to each RO stage (20 – 35 m^3 in volume each); iii. Clean in Place (CIP) circulation tank (4kL) and pump, including storage of citric acid; c) To be located within a sealed concrete bunded hardstand; d) Have a dedicated sump and pump suitable for managing spills and rainwater; e) Tanks to be fitted with level transmitters and/or overflow switches; f) Be designed to AS 4452 -1997 (The storage and Handling of Toxic Substances); and g) Include associated chemical storage and dosing infrastructure (IBCs or poly-ethylene tanks located within secondary containment for Sodium metabisulphite (25 m^3 – Nominal), Sulphuric acid (2 m^3) and Caustic Soda (1 m^3).	As depicted in Figure 6, Schedule 1

Supporting infrastructure			
11.	Wastewater Cyanide Destruction System	Upgrades to existing Wastewater Cyanide Destruction System including: a) Refurbishment of previously decommissioned 10 m^3 stainless steel buffer tank; b) Wastewater transfer pump; and c) Installation of new heat exchanger	N/A
12.	Air Cooled Dump Condenser	Upgrades to the existing air-cooled dump condenser, including the installation of: a) an additional condenser bay (sized for peak load of 23,500 kg/hr of 6.5 bar steam); b) variable speed drive control to installed fans; and c) replacement condensate vessel (nominal size 6m^3).	N/A
13.	Cooling Tower Expansion	Installation of: a) 2 x cooling units (nominally 5MW heat transfer); and b) associated cooling water pumps.	N/A
14.	Natural Gas Treatment Plant	Replacement of the sweet gas filter, and a bypass line around the dehydration unit.	N/A
15.	Utilities and support infrastructure	Upgrades to associated pipework, pipe racks and switchroom.	N/A

Compliance reporting

2. The works approval holder must within 60 calendar days of an item of infrastructure or equipment required by condition 1 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 1; and

(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

3. The Environmental Compliance Report required by condition 2, must include as a minimum the following:

(a) certification by a suitably qualified engineer that the items of infrastructure or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1; and

(c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Time limited operations phase

Commencement and duration

4. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 6:

(a) where the Environmental Compliance Report as required by condition 2 has been submitted by the works approval holder for that item of infrastructure.

5. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 6:

(a) for a period not exceeding 360 calendar days from the day the works approval holder meets the requirements of condition 2 for that item of infrastructure; or

(b) until such time as a licence for that item of infrastructure is granted in accordance with Part V of the *Environmental Protection Act 1986*, if one is granted before the end of the period specified in condition 5(a).

Time limited operations requirements

6. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 2 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 2.

Table 2: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	**Operational requirement**	**Infrastructure location**
1.	Sodium Cyanide Plant 1 upgrades	a) All emissions of process gaseous wastes associated with the infrastructure subject to upgrade must be directed to existing incinerator stacks, startup, shut stacks or solids plant stacks (as applicable), as per the requirements of Licence L6110/1990/13. b) Effluent, wastewater and environmental hazardous materials to be managed as per the requirements of Licence L6110/1990/13.	As depicted in Figure 7, Schedule 1
2.	Sodium Cyanide Solids Plant upgrades		
3.	Sodium Cyanide Solids Plant - ammonia scrubber package	a) Operated to treat ammonia from the SCS waste gas collection header, prior to treatment in the packed bed scrubber; and b) Ammonia scrubber column must be operated targeting a temperature of 0 to 10°C by use of a chilled water circuit.	Figure 5

Time limited operations report

7. The works approval holder must submit to the CEO a report on the time limited operations within 30 calendar days of the completion date of time limited operations or 30 calendar days before the expiration date of the works approval, whichever is the sooner.

8. The works approval holder must ensure the report required by condition 7 includes the following:

(a) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable);

(b) a review of performance and compliance against the conditions of the works approval; and

(c) where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures.

Records and reporting (general)

9. The works approval holder must record the following information in relation to complaints received by the works approval holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:

(a) the name and contact details of the complainant, (if provided);

(b) the time and date of the complaint;

(c) the complete details of the complaint and any other concerns or other issues raised; and

(d) the complete details and dates of any action taken by the works approval holder to investigate or respond to any complaint.

10. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:

(a) the works conducted in accordance with condition 1;

(b) any maintenance of infrastructure that is performed in the course of complying with condition 6; and

(c) complaints received under condition 9.

11. The books specified under condition 10 must:

(a) be legible;

(b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;

(c) be retained by the works approval holder for the duration of the works approval; and

(d) be available to be produced to an inspector or the CEO as required.

Definitions

In this works approval, the terms in Table 3 have the meanings defined.

Table 3: Definitions

Term	Definition
annual period	a 12 month period commencing from 1 January until 31 December of the each year.
AS 4452 -1997	means the standard *AS NZS 4452: The storage and handling of toxic substances*
API	means American Petroleum Institute
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
discharge	has the same meaning given to that term under the EP Act.
emission	has the same meaning given to that term under the EP Act.
environmental commissioning	means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.
Environmental Commissioning Report	means a report on any commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment, and other environmental factors.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
HCN	Hydrogen cyanide
NaCN	Sodium cyanide
NaOH	Sodium hydroxide

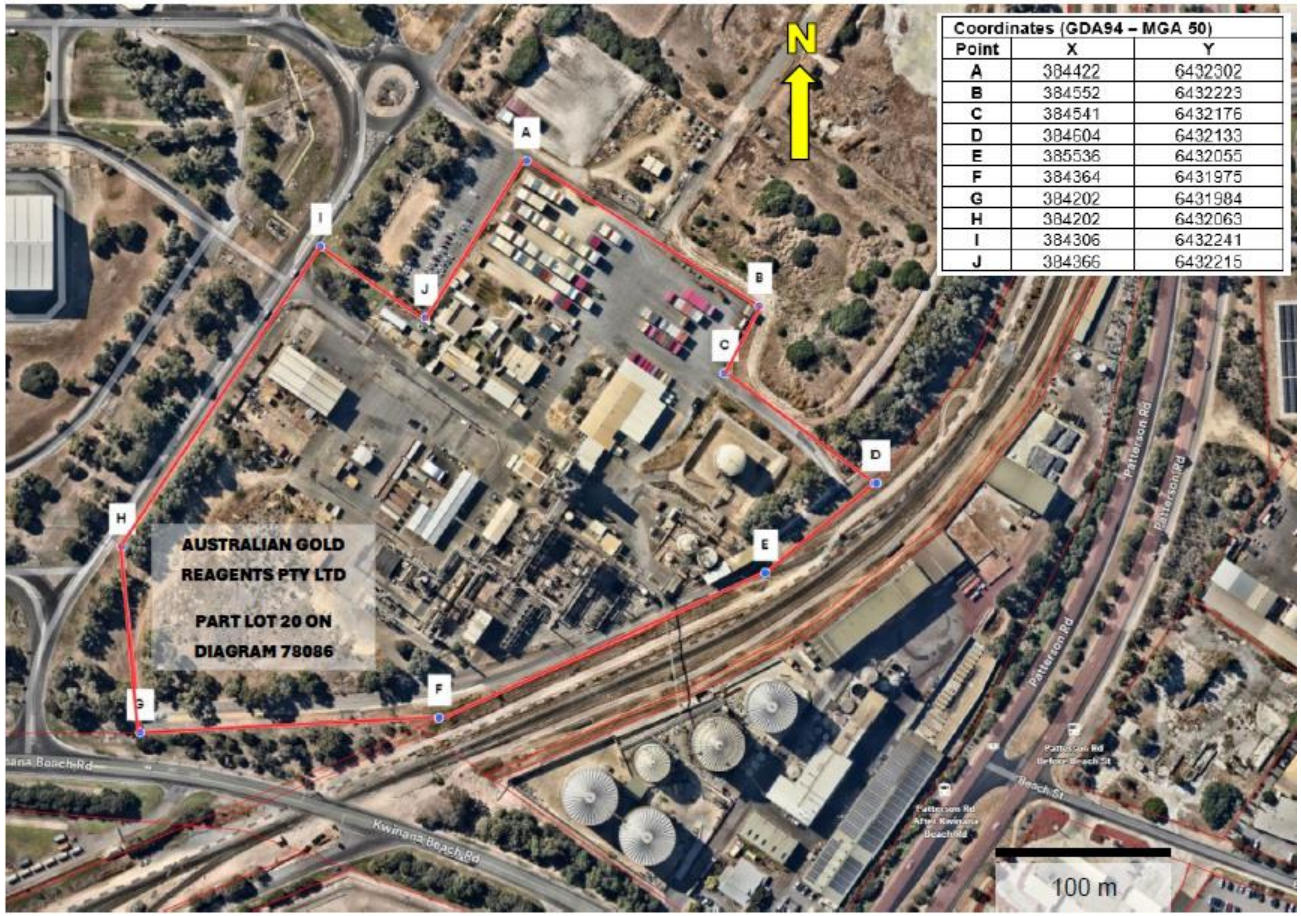
Term	Definition
premises	the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map (Figure 1) in Schedule 1 to this works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
RO	Reverse osmosis
suitably qualified engineer	means a person who holds a tertiary academic qualification in mechanical engineering and has a minimum of five years of experience working in the field of mechanical engineering.
time limited operations	refers to the operation of the infrastructure and equipment identified under this works approval that is authorised for that purpose, subject to the relevant conditions.
waste	has the same meaning given to that term under the EP Act.
works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
works approval holder	refers to the occupier of the premises being the person to whom this works approval has been granted, as specified at the front of this works approval.

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in the map below (Figure 1).



Coordinates (GDA94 – MGA 50)		
Point	X	Y
A	384422	6432302
B	384552	6432223
C	384541	6432176
D	384604	6432133
E	385536	6432055
F	384364	6431975
G	384202	6431984
H	384202	6432063
I	384306	6432241
J	384366	6432215

Figure 1: Map of the boundary of the prescribed premises

Figure 2: General layout of Sodium Cyanide Manufacturing Facility

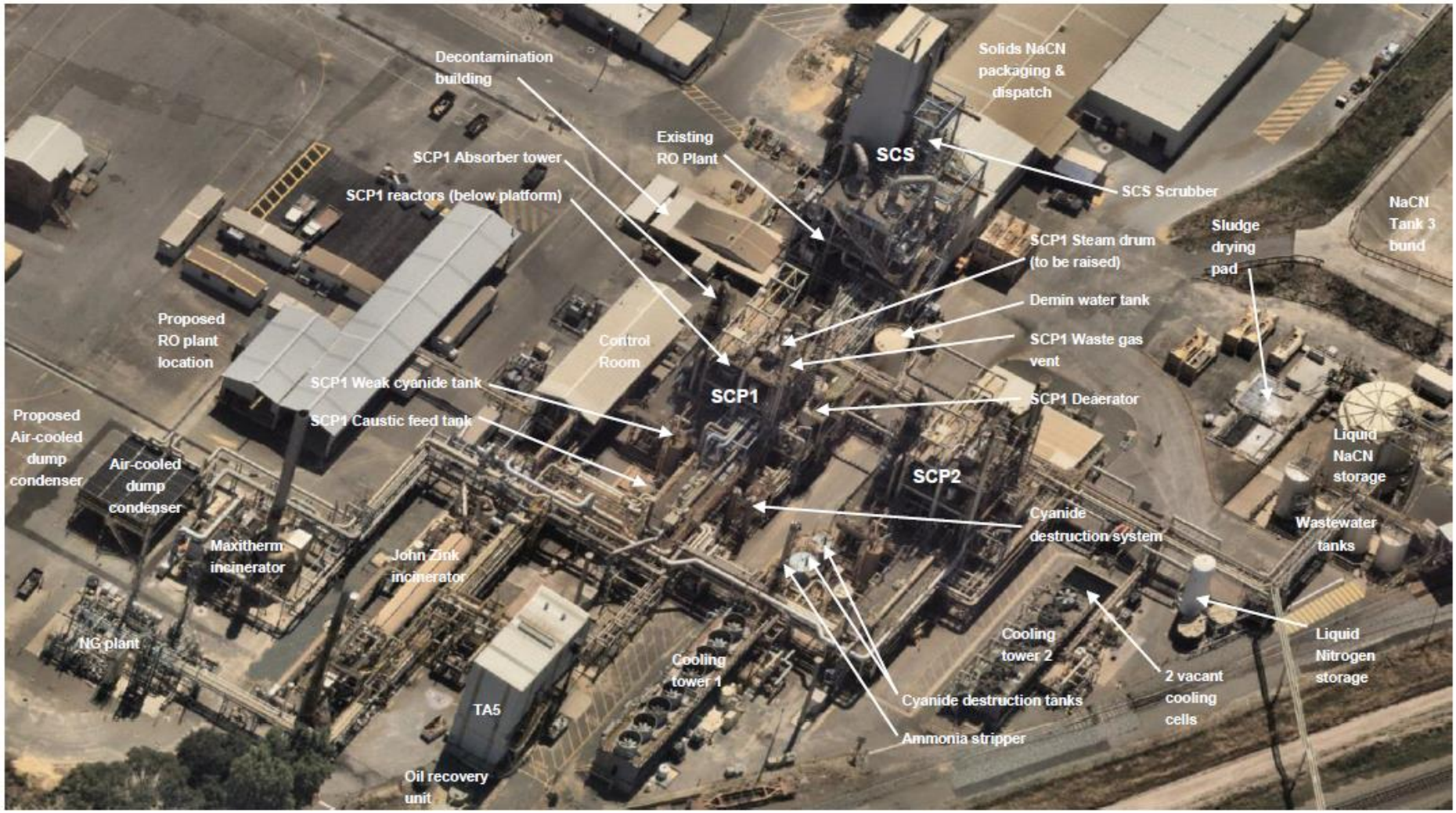


Figure 3: Sodium Cyanide Plant key component identification

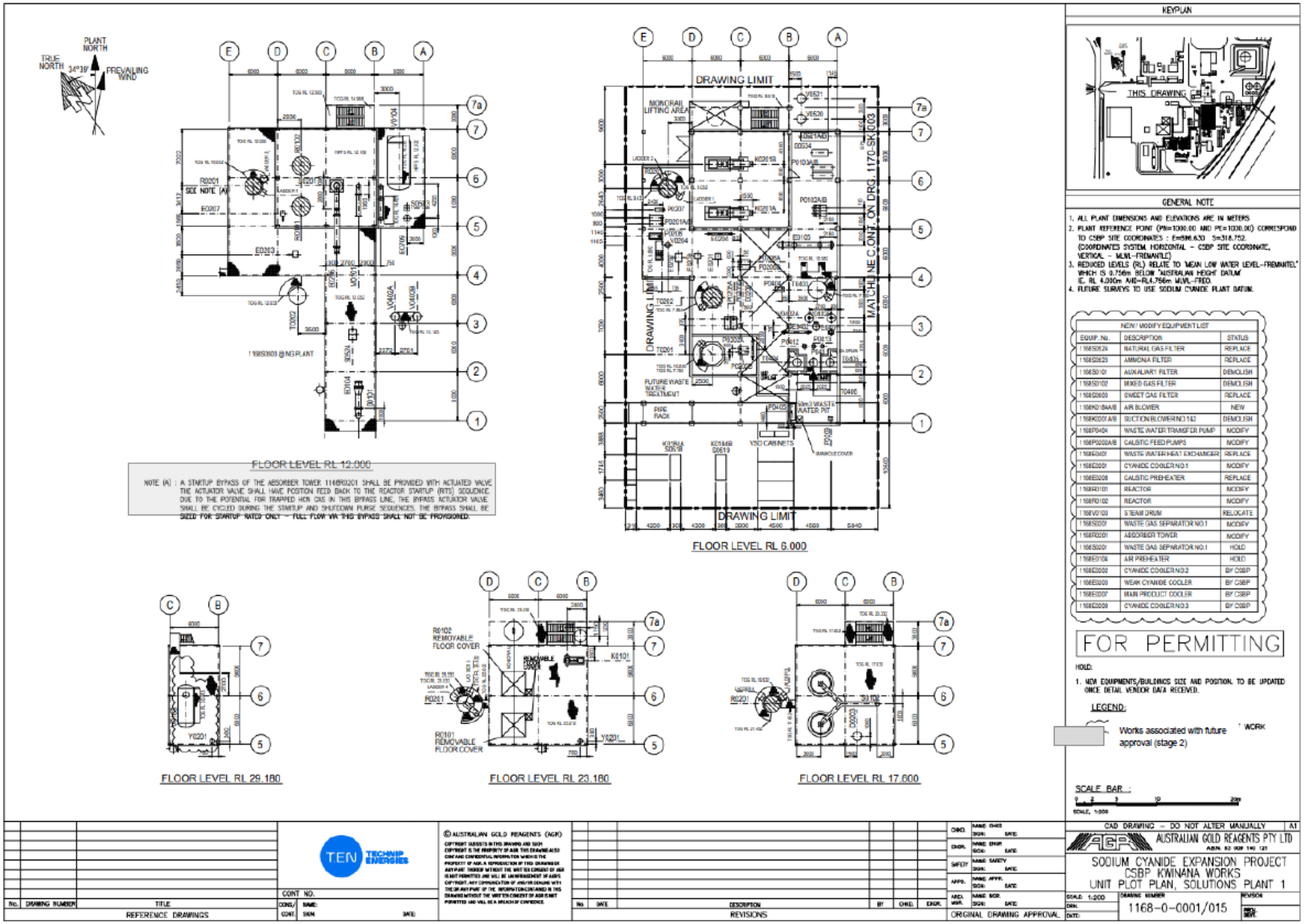


Figure 4: Expansion works layout plan for Sodium Cyanide Plant 1

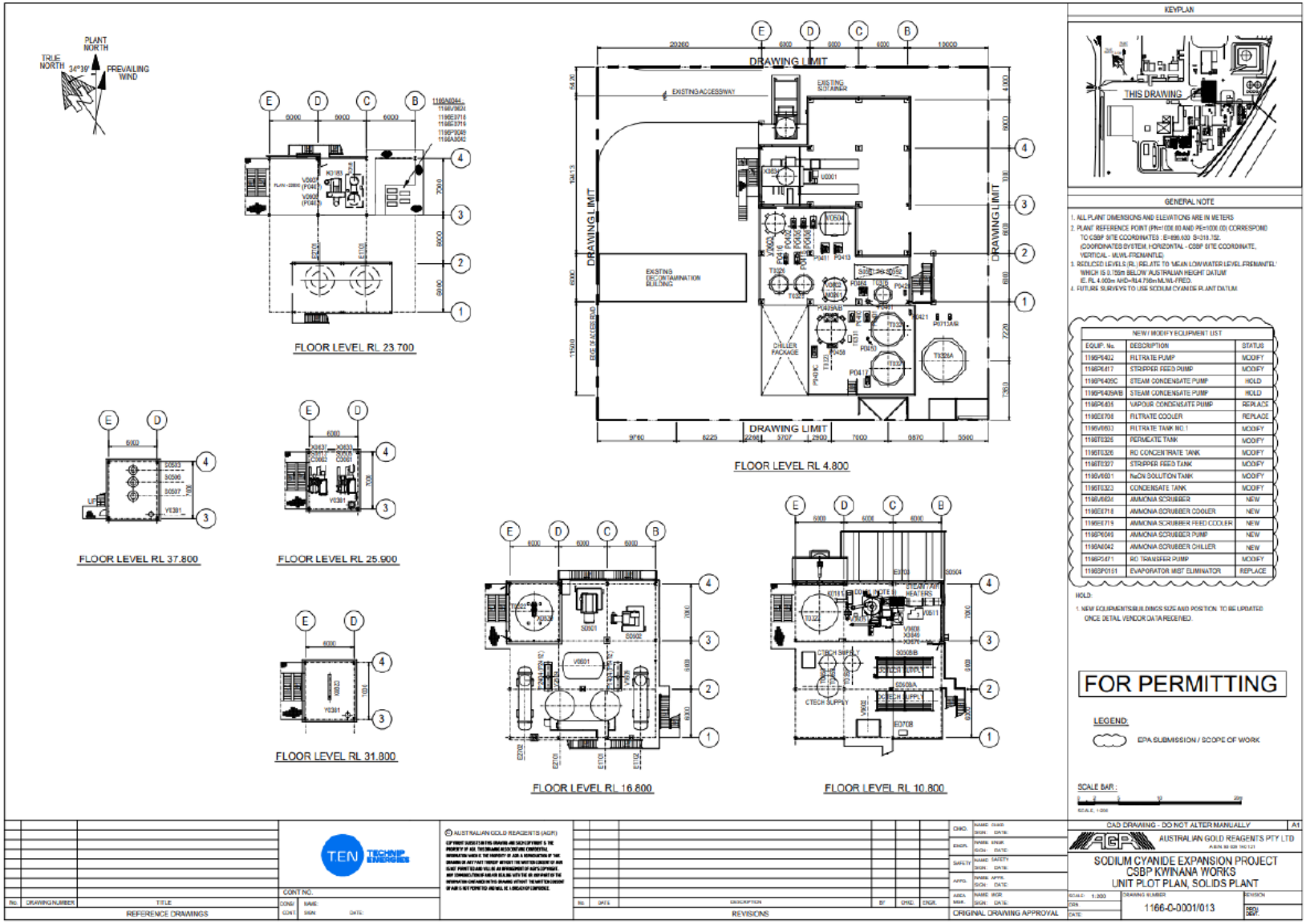


Figure 5: Expansion works layout plan for Sodium Cyanide Solids Plant

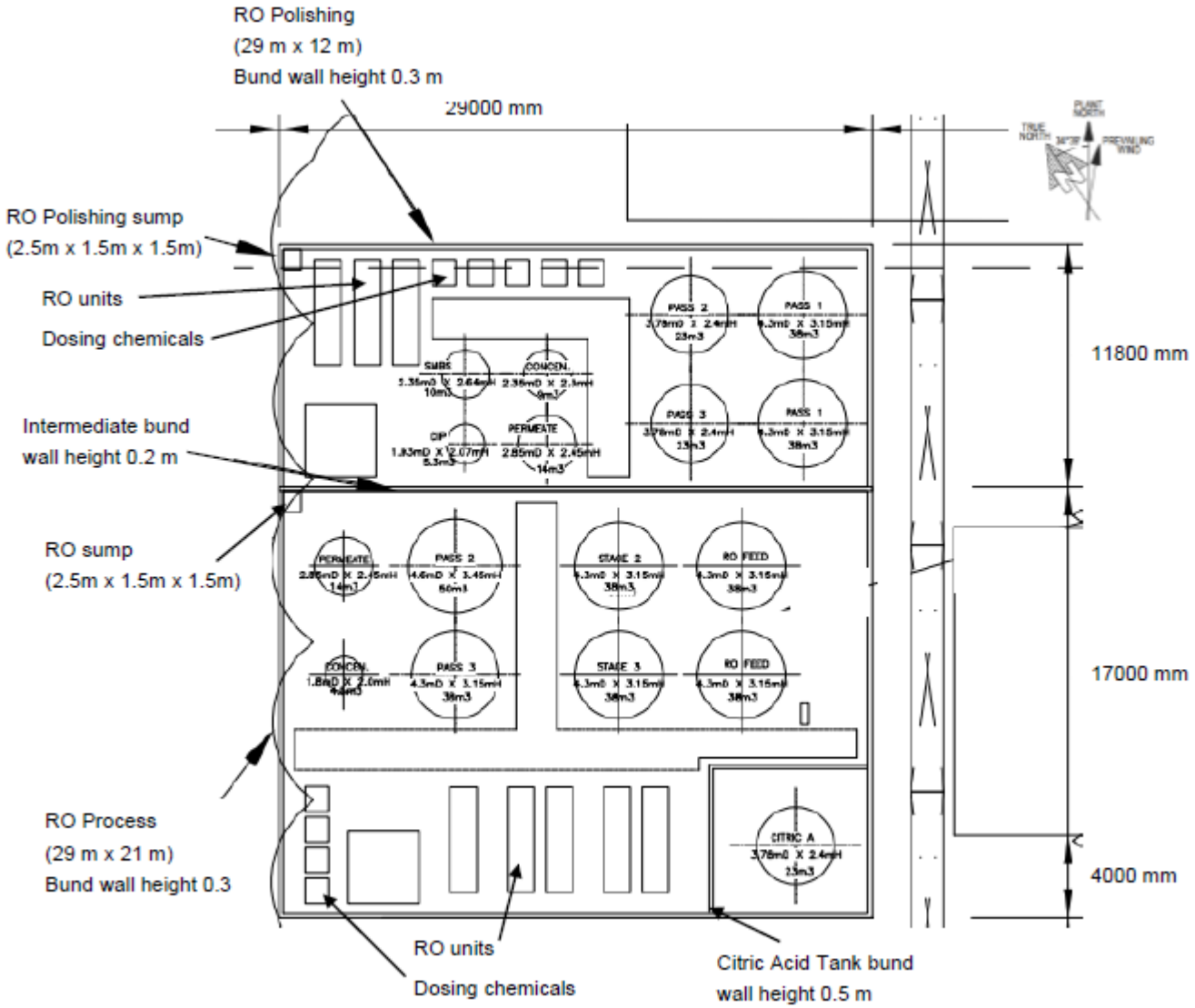


Figure 6: Process RO and Polishing RO treatment plant layout

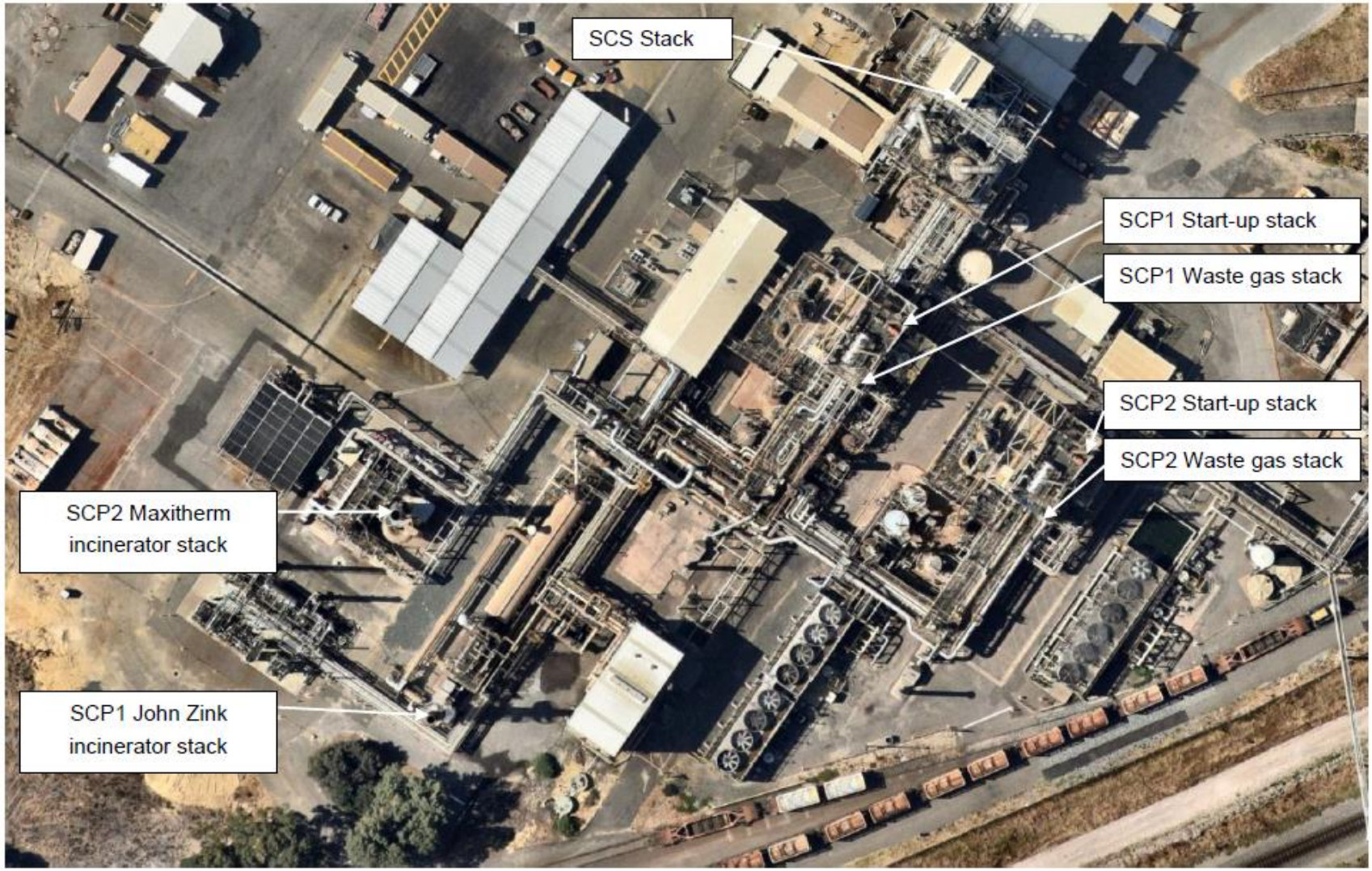


Figure 7: Air emissions discharge locations