



Works approval number	W6332/2019/1
Works approval holder	Woodside Burrup Pty Ltd
ACN	120 237 416
Registered business address	Mia Yellagonga (Karlak) 11 Mount Street PERTH WA 6000
DWER file number	DER2019/000559-1
Duration	28/05/2021 to 27/05/2028
Date of issue	26/05/2021
Premises details	Pluto LNG (Pluto Train 2) Burrup Road BURRUP WA 6714 Legal description - Lot 384 on Deposited Plan 220146 and Lots 572 and 574 on Deposited Plan 28209 As defined by the coordinates in Schedule 1

Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed production / design capacity
Category 10: Oil or gas production from wells	6.5 million tonnes per year
Category 34: Oil or gas refining	5.3 million tonnes per year (LNG) 82,125 terajoules per year (domgas)
Category 52: Electric power generation	43 MW

This works approval is granted to the works approval holder, subject to the attached conditions, on 26 May 2021, by:

Manager, Process Industries

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

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;
 - (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	Design and construction / installation requirements	Infrastructure location
1.	<p>1 x 5.3 Mtpa LNG Processing Train including:</p> <ul style="list-style-type: none"> inlet gas conditioning and condensate stabilisation system including pig receiver and inlet separator; Heavies Removal Unit (HRU); inlet air chilling system; liquefaction unit; three multi-staged refrigerant circuits driven by 6 x GE LM6000PF+ DLE aero-derivative gas turbine compressors (GTCs 1 – 6); acid gas removal unit (AGRU); and nitrogen removal unit (NRU). 	<ul style="list-style-type: none"> Dry Low NOx emissions reduction control installed on all GTCs. Ethylene refrigerant GTCs to have Waste Heat Recovery Units (WHRUs) with closed loop, hot oil heating medium for heat supply elsewhere in the process. GTCs to have minimum stack exhaust heights of 50 m above ground level. Stack exhaust and vent sampling ports on each GTC installed in accordance with AS4323.1. PEMS to be installed on each GTC in accordance with the requirements of US EPA Performance Specification 16 or equivalent. AGRU to include a Recuperative Thermal Oxidiser (RcTO) with: <ul style="list-style-type: none"> minimum stack height 16m above ground level; and stack exhaust sampling port(s) installed in accordance with AS4323.1. NRU to include a RcTO with: <ul style="list-style-type: none"> minimum stack height 30m above ground level; and stack exhaust sampling ports installed in accordance with AS4323.1. Mercury removal unit (MRU) to be installed upstream of the AGRU. 	<p>Location of inlet facilities depicted by “3” in Figure 2</p> <p>Remaining infrastructure located within Train 2 boundary depicted by purple line on Figure 2</p> <p>GTC stacks shown as A14 – A19 in Figure 3</p>
2.	<p>1 x 225 TJ/day Domgas Plant including Includes pre-heating unit, after filters, electric drive compressor and metering unit.</p>	<p>MRU to be installed prior to feed gas entering Domgas Plant.</p>	<p>Within DomGas boundary (depicted by green line)</p>

	Infrastructure	Design and construction / installation requirements	Infrastructure location
3.	1 x 43 MW GE Frame 6B gas turbine generator (GTG)	Includes: <ul style="list-style-type: none"> • Dry Low NOx emissions reduction control; • minimum stack exhaust height of 30m above ground level; • stack exhaust sampling port installed in accordance with AS4323.1; and • PEMS to be installed on GTG in accordance with the requirements of US EPA Performance Specification 16 or equivalent. 	Within Train 2 boundary depicted by purple line on Figure 2 GTG stack shown as A22 in Figure 3 Diesel generator stack shown as A23 in Figure 3
4.	1 x 2 MW Emergency standby diesel generator (ESDG)	Includes inbuilt diesel day tank contained within skid; and Minimum exhaust stack height 4 m above ground level.	
5.	Utilities and general facilities including: <ul style="list-style-type: none"> • Refrigerant storage unit, including: <ul style="list-style-type: none"> - 3 x ethylene storage drums; and - 2 x propane storage drums • Amine storage tank • Pentane storage (required for HRU in the dry feed gas). • 2 x Boil Off Gas Blowers for compression and return of vapours during ship loading • Surface water drainage system 	<ul style="list-style-type: none"> • ethylene storage drums are pressurised, double walled and vacuum jacketed. • propane storage drums fitted with level alarms. • Amine storage tank fitted with high level alarms, over pressure protection, overflow siphon break • Premises surface water drainage systems designed to: <ul style="list-style-type: none"> - collect and direct uncontaminated water away from premises infrastructure and processing areas; and - collect and direct potentially contaminated stormwater to for treatment and disposal via the Effluent Treatment Plant (W1). • Hydrocarbon and chemical storage areas must be designed and constructed in accordance with AS 1940 and AS 1692. 	Not shown W1 shown in Figure 3

Compliance reporting

2. The works approval holder must within 60 calendar days of the items of infrastructure, or component(s) thereof, as specified by condition 1, being constructed:
 - (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(a), must include as a minimum the following:
 - (a) certification 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) a detailed site plan showing the as constructed location of 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.

Environmental commissioning phase

Environmental commissioning requirements and emission limits

4. The works approval holder may only commence environmental commissioning of an item of infrastructure, or component(s) thereof, listed in condition 1 once the Environmental Compliance Report has been submitted for that item of infrastructure, of component(s) thereof, in accordance with condition 2 of this works approval.
5. Any environmental commissioning activities undertaken for an item of infrastructure, or component(s) thereof, specified in Table 1 may only be carried out:
 - (a) in accordance with the corresponding commissioning phase; and
 - (b) for the corresponding authorised commissioning duration, as set out in Table 2.

Table 2: Environmental commissioning duration

Infrastructure	Commissioning phase	Authorised commissioning duration
Pluto Train 2, DomGas Plant and common utilities and general infrastructure	Environmental commissioning	For a period not exceeding 36 months in aggregate from the date commissioning commenced

6. The works approval holder must provide to the CEO:
 - (a) notification of the commencement of environmental commissioning within 7 days of environmental commissioning commencing;
 - (b) notification of the introduction of feed gas to the Pluto Train 2 inlet facilities within 7 days of commencing; and
 - (c) notification of the completion of environmental commissioning within 7 days of environmental commissioning being completed.
7. During environmental commissioning, the works approval holder must ensure that the emissions specified in Table 3, are discharged only from the corresponding discharge point(s) and only at the corresponding discharge point location(s).

Table 3: Authorised discharge points during environmental commissioning

Emission	Discharge point	Minimum discharge point height (m AGL)	Discharge point location (Schedule 1: Map of emission points to air)
NO _x SO _x	6 x GE LM6000PF+ DLE aero-derivative GTCs (GTC 1 – 6)	50m AGL	A14 – A19
CO	Storage and loading flare	60m AGL	A13
VOCs (including BTEX)	Cold dry flare	130m AGL	A10, A11 and A12
PM	Warm wet flare		
	Common spare flare		
	GTG 1	30m AGL	A22
	ESDG	4m AGL	A23
NO _x SO _x CO	AGRU RcTO	16m AGL	A20
VOCs (including BTEX) H ₂ S PM	NRU RcTO	30m AGL	A21
Contaminated wastewater and stormwater	Pluto LNG Project Effluent Treatment Plant (ETP)	N/A	W1

Monitoring during environmental commissioning

8. The works approval holder must monitor emissions during environmental commissioning in accordance with Table 4.

Table 4: Emissions and discharge monitoring during environmental commissioning

Discharge point	Monitoring location (Schedule 1: Map of emission points to air)	Parameter	Frequency	Averaging Period	Unit	Method
GTCs 1- 6 and GTG 1 ^{1, 2}	A14 – A19 and A22	NOx	Quarterly if operating	Minimum 30 minutes	mg/m ³	USEPA Method 7E
		SO ₂				USEPA Method 6C
		CO				USEPA Method 10
		Total VOCs				USEPA Method 18
		Volumetric flow rate			m ³ / s	AS4323.1 or USEPA Method 2
		Fuel consumption	Continuous whilst operating	Monthly	m ³	None specified
GTCs 1- 6 and GTG 1 ^{1, 2}	A14 – A19 and A22	NOx	Continuous whilst operating	N/A	mg/m ³	PEMS
		CO			m ³	US EPA Performance Specification 16 or equivalent
		Fuel consumption				
ESDG	A23	Fuel consumption	Continuous whilst operating	Monthly	m ³	None specified
AGRU and NTU RCTOs ^{1, 3}	A20 and A21	NOx	Quarterly if operating	Minimum 30 minutes	mg/m ³	USEPA Method 7E
		SO ₂				USEPA Method 6C
		CO				USEPA Method 10
		Total VOCs				USEPA Method 18
		H ₂ S				USEPA Method 15
		Volumetric flow rate			m ³ / s	AS4323.1 or USEPA Method 2
		Fuel consumption	Continuous whilst operating	Monthly	m ³	None specified

Cold dry flare, Warm wet flare, Common spare flare and Storage and loading flare	A10, A11, A12 and A13	Volume of gas flared from activities associated with operation of Pluto Train 2 and Domgas Plant	Continuous whilst operating	Monthly	m ³	None specified
		Dark Smoke Emissions ⁵	During flaring events associated with the operation of Pluto Train 2 and Domgas Plant where a shade greater than Ringelmann 1 emitted for a period of 30 minutes or more	Test specific	Ringelmann shade number	Ringelmann Method

Note 1: All units are referenced to STP dry.

Note 2: Concentration units for all gases are referenced to 15% O₂

Note 3: Concentration units for all gases are referenced to 3% O₂

Note 4: Stack testing shall be undertaken to reflect Normal Operating Conditions

Note 5: In-field non-NATA accredited monitoring permitted.

9. The works approval holder must monitor the ambient air during environmental commissioning for concentrations of the identified parameters in accordance with Table 5.

Table 5: Monitoring of ambient concentrations during environmental commissioning

Monitoring location (Schedule 1: Ambient monitoring locations)	Parameter	Unit	Frequency	Averaging period	Method
Burrup, Dampier and Karratha Ambient Monitoring Station	O ₃	ppb	Continuous	1-hour	AS 3580.6.1
				4-hour	
	NO, NO ₂ , NO _x			1-hour	AS 3580.5.1
	BTEX	ppm		1-hour	AS 3580.11.1

10. The works approval holder must monitor the ambient meteorological conditions at the premises in accordance with the requirements specified in Table 6 and record the results of all such monitoring.

Table 6: Monitoring of ambient meteorological conditions

Parameter	Unit	Monitoring location(s) Schedule 1: Ambient monitoring locations	Height	Frequency	Averaging period	Method
Wind speed	m/s	Burrup, Dampier and Karratha Ambient Monitoring Stations	10 m	Continuous	1-hour	AS 3580.14
Wind direction	degrees					
Wind direction (standard deviation)						
Temperature	° Celsius		4 m		5-minute and 1-hour	
Relative humidity	%					
Solar radiation	W/m ²					

11. The works approval holder must record the results of all monitoring activity required by conditions 8, 0 and 0.
12. The works approval holder shall ensure that all non-continuous sampling and analysis undertaken pursuant to Condition 8 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis unless indicated otherwise in the relevant table.
13. For any parameter in Table 4, Table 5 and Table 6 requiring continuous monitoring, the works approval holder shall ensure that the continuous monitoring equipment is available for at least 90% of operational time in a calendar month and available 95% of the operational time in the preceding 12 months.
14. The works approval holder shall ensure that the PEMS required under any condition of this works approval is regularly operated, maintained and calibrated in accordance with US EPA Performance Specification 16 or equivalent.
15. The works approval holder shall ensure that results from PEMS are made available on request as tabulated data and time series graphs including:
 - (a) times and dates;
 - (b) limit exceedances; and
 - (c) any relevant process, production or operational data recorded under condition 8.
16. The works approval holder shall record production or throughput data and any other process parameters relevant to any non-continuous or continuous monitoring undertaken.

Reporting

17. The works approval holder must submit to the CEO an Environmental Commissioning Progress Report:
 - (a) for the first 12 months of environmental commissioning, within 60 days of completing the first 12 months of environmental commissioning; and

- (b) for the second 12 months of environmental commissioning, within 60 days of completing the second 12 months of environmental commissioning.
- 18.** The works approval holder must ensure the Environmental Commissioning Progress Reports required by condition 170 of this works approval include the following:
- (a) a summary of the environmental commissioning activities undertaken in the preceding 12 months of environmental commissioning, including the amount of LNG, natural gas and condensate processed;
 - (b) a summary of environmental commissioning activities expected to be completed in the following 12 months of environmental commissioning, including timeframes;
 - (c) the results of point-source emissions monitoring, ambient air monitoring and meteorological monitoring recorded in accordance with conditions 8, 0 and 0 for the preceding 12 months of environmental commissioning; and
 - (d) the volumes of wastewater used for hydrostatic testing during the preceding 12 months of environmental commissioning, details of the monitoring regime(s) implemented and results recorded, and discharge locations or disposal methods employed.
- 19.** The works approval holder must submit to the CEO a Final Environmental Commissioning Report within 60 calendar days of the completion date of environmental commissioning.
- 20.** The works approval holder must ensure the Environmental Commissioning Report required by condition 19 of this works approval includes the following:
- (a) a summary of the environmental commissioning activities undertaken during the final 12 months of environmental commissioning, including timeframes and amount of LNG, natural gas and condensate processed;
 - (b) the point-source emission monitoring, ambient air monitoring and meteorological monitoring results recorded in accordance with conditions 8, 0 and 0 during the final 12 months of environmental commissioning.
 - (c) a summary of the environmental performance of each item of infrastructure or equipment as constructed or installed (as applicable), which at minimum includes records detailing:
 - (i) the volumes of wastewater used for hydrostatic testing, details of the monitoring regime(s) implemented and results recorded, and discharge locations or disposal methods employed during the final 12 months of environmental commissioning; and
 - (ii) a comparison of all the measured point source emissions against infrastructure design specifications and ambient air quality against those predicted in the Premises Air Quality Management Plan;
 - (d) details of commissioning of the PEMS and compliance with US EPA Performance Specification 16 or equivalent;
 - (e) a review of the works approval holder's performance and compliance against the conditions of this works approval; and
 - (f) where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Time limited operations phase

Commencement and duration

21. The works approval holder may conduct time limited operations for the infrastructure specified in condition 1:
- for a period not exceeding 270 calendar days from the date of completion of environmental commissioning; or
 - until such time as a licence for that item of infrastructure is granted in accordance with Part V of the *Environmental Protection Act 1986*, whichever occurs sooner.

Time limited operations requirements and emission limits

22. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 7 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 7.

Table 7: Infrastructure and equipment requirements during time limited operations

Site infrastructure and equipment	Operational requirement	Infrastructure location (Figures 2 and 3)
Pluto Train 2	Water recovered from the molecular sieve Dehydration Unit to be recycled to the inlet facilities and the AGRU	Within Train 2 boundary depicted by purple line in Figure 2
Pluto Train 2 GTCs 1 - 6	During Normal Operating Conditions each GTC must be operated with: <ul style="list-style-type: none"> DLE combustor system; Turbine Inlet Air Chilling (IAC); WHRUs; and a PEMS. 	Within Train 2 boundary depicted by purple line in Figure 2 GTC stacks shown as A14 – A19 in Figure 3
Pluto Train 2 GTG	During Normal Operating Conditions the GTG must be operated with: <ul style="list-style-type: none"> DLE combustor system; Turbine IAC; and a PEMS. 	Within Train 2 boundary depicted by purple line in Figure 2 GTG stack shown as A22 in Figure 3
Storage and loading flare	Flaring must not occur during Normal Operating Conditions except for the following: <ul style="list-style-type: none"> pilot and purge requirements; during ship loading or de-inerting; and when BOG compressors are unavailable. 	A13 as shown in Figure 2
Cold dry flare	Flaring must not occur during Normal Operating Conditions except for pilot and purge requirements	A10, A11 and A12 as shown in Figure 3
Warm wet flare		
Common spare flare		
MRU	Feed gas must be directed through the MRU	Within Train 2 boundary depicted by

Site infrastructure and equipment	Operational requirement	Infrastructure location (Figures 2 and 3)
	prior to entering the AGRU.	purple line in Figure 2
AGRU	Acid gases recovered by the AGRU must be directed to AGRU RcTO for combustion. If the AGRU RcTO is not operating, acid gases must be directed to the flare(s) for combustion.	Within Train 2 boundary depicted by purple line in Figure 2 RcTO stack shown as A20 in Figure 3
AGRU RcTO	The AGRU RcTO must be operated with continuous monitoring of: <ul style="list-style-type: none"> • combustion chamber temperature; • oxygen in the flue gas; and • fuel gas composition. 	RcTO stack shown as A20 in Figure 3
NRU	Nitrogen gas recovered by the NRU must be directed to NRU RcTO for combustion. If the NRU RcTO is not operating NRU waste stream must be directed to the flare(s) for combustion.	Within Train 2 boundary depicted by purple line in Figure 2 RcTO stack shown as A21 in Figure 3
NRU RcTO	The NRU RcTO must be operated with continuous monitoring of: <ul style="list-style-type: none"> • combustion chamber temperature; • oxygen in the flue gas; and • fuel gas composition. 	RcTO stack shown as A21 in Figure 3
Hydrocarbon / chemical storage	All hydrocarbon and chemical storage areas must be designed and constructed in accordance with AS 1940 and AS 1692; and Spills or leaks of hydrocarbons and chemicals must be immediately cleaned up and stored in impervious containers for disposal via licensed contractor	Not shown
Drainage systems, bunded areas and wastewater storage infrastructure	Hydrocarbon contaminated stormwater generated on the Premises must be either re-used in the process, directed to the Pluto LNG ETP for treatment and disposal or disposed by other lawful means.	

23. During time limited operations, the works approval holder must ensure that the emission(s) specified in Table 8, are discharged only from the corresponding discharge point(s) and only at the corresponding discharge point location(s).

Table 8: Authorised discharge points during time limited operations

Emission	Discharge point	Minimum discharge point height	Discharge point location (Schedule 1: Map of emission points to air)
NO _x	GTC 1 – 6	50m AGL	A14 – A19
SO _x	Storage and loading flare	60m AGL	A13
CO	Cold dry flare	130m AGL	A10, A11 and A12
VOCs (including BTEX)	Warm wet flare		
PM	Common spare flare		
	GTG 5	30m AGL	A22
	ESDG	4m AGL	A23
NO _x	AGRU RcTO	16m AGL	A20
SO _x	NRU RcTO	30m AGL	A21
CO			
VOCs (including BTEX)			
H ₂ S			
PM			
Contaminated wastewater and stormwater	ETP or other lawful disposal	N/A	W1

- 24.** During time limited operations, the works approval holder must ensure that the emissions from the discharge points listed in Table 9 do not exceed the corresponding limit(s) when monitored in accordance with condition 25.

Table 9: Emission and discharge limits during time limited operations

Discharge point (Schedule 1: Map of emission points to air)	Parameter	Limit (including units) ^{1, 2}	Averaging period
A14 – A19 (GTCs 1 – 6) and A22 (GTG)	NO _x	≤100 mg/m ³	Stack test average over a period of not less than 30 minutes
A22 (GTG)		≤140 mg/m ³ when operating on Low Load	Stack test average over a period of not less than 30 minutes
A20 (NRU RcTO) and A21 (AGRU RcTO)		≤100 mg/m ³	Stack test average over a period of not less than 30 minutes

Note 1: All units for A14 – A19 and A22 are referenced to STP dry and 15% O₂.

Note 2: All units for A20 and A21 are referenced to STP dry and 3% O₂.

Monitoring during time limited operations

25. The works approval holder must monitor emissions during time limited operations in accordance with Table 10.

Table 10: Emissions and discharge monitoring during time limited operations

Discharge point	Monitoring location (Schedule 1: Map of emissions points to air)	Parameter	Frequency	Averaging Period	Unit	Method
GTCs 1- 6 and GTG 1 ^{1, 2}	A14 – A19	NOx	Quarterly	Minimum 30 minutes	mg/m³	USEPA Method 7E
		SO ₂				USEPA Method 6C
		CO				USEPA Method 10
		Total VOCs				USEPA Method 18
		Volumetric flow rate			m³ / s	AS4323.1 or USEPA Method 2
		Fuel consumption	Continuous whilst operating	Monthly	m³	None specified
GTCs 1- 6 and GTG 1 ^{1, 2}	A14 – A19	NOx	Continuous whilst operating	N/A	mg/m³	PEMS
		CO			m³	US EPA Performance Specification 16 or equivalent
		Fuel consumption				
ESDG	N/A	Fuel consumption	Continuous whilst operating	Monthly	m³	None specified
AGRU and NRU RcTOs ^{1, 3}	A20	NOx	Quarterly	Minimum 30 minutes	mg/m³	USEPA Method 7E
		SO ₂				USEPA Method 6C
		CO				USEPA Method 10
		VOCs (including BTEX)				USEPA Method 18
		H ₂ S				USEPA Method 15
		Volumetric flow rate			m³ / s	AS4323.1 or USEPA Method 2
		Fuel consumption	Continuous whilst operating	Monthly	m³	None specified
Cold dry flare, Warm wet flare, Common spare flare	A10, A11, A12 and A13	Volume of gas flared from Train 2 activities and processing of domestic gas	Continuous whilst operating	Monthly	m³	None specified

and Storage and loading flare		Dark Smoke Emissions ⁵	During flaring events associated with the operation of Pluto Train 2 and Domgas Plant where a shade greater than Ringelmann 1 emitted for a period of 30 minutes or more	Test specific	Ringelmann shade	Ringelmann Method
-------------------------------	--	-----------------------------------	--	---------------	------------------	-------------------

Note 1: All units are referenced to STP dry.

Note 2: Concentration units for all gases are referenced to 15% O₂

Note 3: Concentration units for all gases are referenced to 3% O₂

Note 4: Stack testing shall be undertaken to reflect Normal Operating Conditions

Note 5: In-field non-NATA accredited monitoring permitted.

26. The works approval holder must monitor the ambient air during time limited operations for concentrations of the identified parameters in accordance with Table 11.

Table 11: Monitoring of ambient concentrations during time limited operations

Monitoring location (Schedule 1: Ambient monitoring locations)	Parameter	Unit	Frequency	Averaging period	Method	
Burrup, Dampier and Karratha Ambient Monitoring Stations	O ₃	ppb	Continuous	1-hour	AS 3580.6.1	
				4-hour		
	NO, NO ₂ , NO _x	ppm		1-hour	AS 3580.5.1	
	BTEX			1-hour	AS 3580.11.1	

27. The works approval holder must monitor the ambient meteorological conditions during time limited operations in accordance with the requirements specified in Table 12 and record the results of all such monitoring.

Table 12: Monitoring of ambient meteorological conditions

Parameter	Unit	Monitoring location(s) (Schedule 1: Ambient monitoring locations)	Height	Frequency	Averaging period	Method
Wind speed	m/s	Burrup, Dampier and Karratha Ambient Monitoring Stations	10 m	Continuous	1-hour average	AS 3580.14
Wind direction	degrees					
Wind direction (standard deviation)						
Temperature	° Celsius		4 m			
Relative humidity	%					
Solar radiation	W/m ²					

28. The works approval holder must record the results of all monitoring activity required by conditions 25, 26 and 27.
29. The works approval holder shall ensure that all non-continuous sampling and analysis undertaken pursuant to condition 25 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis unless indicated otherwise in the relevant table.
30. For any parameter in Table 10, Table 11 and Table 12 requiring continuous monitoring, the works approval holder shall ensure that the continuous monitoring equipment is available for at least 90% of operational time in a calendar month and available 95% of the operational time in the preceding 12 months.
31. The works approval holder shall ensure that the PEMS required under any condition of this works approval is regularly operated, maintained and calibrated in accordance with US EPA Performance Specification 16 or equivalent.
32. The works approval holder shall ensure that results from PEMS are made available on request as tabulated data and time series graphs including:
 - (d) times and dates;
 - (e) limit exceedances; and
 - (f) any relevant process, production or operational data recorded under condition 25.
33. The works approval holder shall record production or throughput data and any other process parameters relevant to any non-continuous or continuous monitoring undertaken.
34. Within 30 days of the commencement date of time limited operations, the works approval holder must retain the services of a person qualified and experienced in the area of environmental noise assessment and who by their qualifications and experience is eligible to hold membership of the Australian Acoustical Society or the Australian Association of Acoustical Consultants to:
 - (a) investigate the nature and extent of noise emissions from the premises;
 - (b) assess in accordance with the methodology required in the *Environmental Protection (Noise) Regulations 1997*, the compliance of the noise emissions from the primary activities, against the relevant assigned levels specified in those Regulations; and
 - (c) compile and submit to the works approval holder within 3 months of the commencement of time limited operations, a report in accordance with condition 35.
35. A report prepared pursuant to condition 34 (c) is to include:
 - (a) a description of the methods used for monitoring and/or modelling of noise emissions from the premises;
 - (b) details and the results of the investigation undertaken pursuant to condition 34(a);
 - (c) details and results of the assessment of the noise emissions from the premises, against the relevant assigned levels in the *Environmental Protection (Noise) Regulations 1997* undertaken pursuant to condition 34(b); and
 - (d) an assessment of noise levels against the most recent previous noise assessment.

- 36.** Where an assessment pursuant to condition 34(b) indicates that noise emissions do not comply with the relevant assigned levels in the *Environmental Protection (Noise) Regulations 1997*, the works approval holder must:
- (a) within 60 days of receiving an assessment report pursuant to condition 35(c) prepare a plan to ensure the undertaking of the prescribed activity will no longer lead to any contravention of the *Environmental Protection (Noise) Regulations 1997*; and
 - (b) provide to the CEO a copy of the plan prepared pursuant to condition 36(a) within 30 days of its preparation.

Compliance reporting

- 37.** The works approval holder must submit to the CEO a report on the time limited operations within 60 calendar days of the completion date of time limited operations or 60 calendar days before the expiration date of the works approval, whichever is the sooner.
- 38.** The works approval holder must ensure the report required by condition 37 includes the following:
- (a) a summary of the time limited operations, including timeframes and amount of LNG, natural gas and condensate processed;
 - (b) a summary of point source air, ambient air, meteorological concentrations and noise emissions from monitoring performed during time limited operations under conditions 25, 26, 27 and 34;
 - (c) the types and volumes of wastewater generated during commissioning, and the monitoring regimes, discharge location or disposal methods employed;
 - (d) a summary of the environmental performance of each item of infrastructure or equipment as constructed or installed (as applicable), which at minimum includes records detailing a comparison of the measured point source emissions against infrastructure design specifications and ambient air quality against those predicted in the premises Air Quality Management Plan;
 - (e) a review of the works approval holder's performance and compliance against the conditions of this works approval; and
 - (f) where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Records and reporting (general)

- 39.** 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.

- 40.** 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) summary of maintenance of infrastructure that is performed in the course of complying with condition 22;
 - (c) monitoring programmes undertaken in accordance with conditions 8, 0, 0, 25, 26, 27 and 34; and
 - (d) complaints received under condition 39.
- 41.** The books specified under condition 40 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 13 have the meanings defined.

Table 13: Definitions

	Definition
ACN	Australian Company Number
AGL	means above ground level
Air Quality Management Plan	means the Air Quality Management Plan submitted by the works approval holder in support of this works approval application
aMDEA	means activated methyldiethanolamine
AS 1692	means Australian Standard 1692: <i>Steel tanks for flammable and combustible liquids</i>
AS 1940	means Australian Standard 1940: <i>The storage and handling of flammable and combustible liquids</i>
AS 3580.4.1	means Australian Standard 3580.4.1: <i>Methods for sampling and analysis of ambient air Determination of sulfur dioxide - Direct reading instrumental method</i>
AS 3580.5.1	means Australian Standard 3580.5.1: <i>Methods for sampling and analysis of ambient air Determination of oxides of nitrogen - Chemiluminescence method</i>
AS 3580.6.1	means Australian Standard 3580.6.1: <i>Methods for sampling and analysis of ambient air - Determination of ozone - Direct-reading instrumental method</i>
AS 3580.7.1	means Australian Standard 3580.7.1: <i>Methods for sampling and analysis of ambient air Determination of carbon monoxide - Direct-reading instrumental method</i>
AS 3580.11.1	means Australian Standard 3580.11.1: <i>Methods for sampling and analysis of ambient air Guide to siting air monitoring equipment</i>
AS 3580.14	means Australian and New Zealand Standard 3580.14: <i>Methods for sampling and analysis of ambient air – meteorological monitoring for ambient air quality monitoring applications, as amended from time to time</i>
AS4323.1	means Australian Standard 4323: <i>Stationary source emissions Selection of sampling positions</i>
Averaging Period	means the time over which a limit is measured or a monitoring result is obtained
books	has the same meaning given to that term under the EP Act.
BTEX	means benzene, toluene, ethylbenzene and xylene

.	Definition
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
CO	means Carbon Monoxide
condition	a condition to which this works approval is subject to under section 62 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> 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.
DLE	means dry low emissions
domgas	means domestic gas
emission	has the same meaning given to that term under the EP Act.
environmental commissioning	means the sequence of activities to be undertaken following the start-up of the GTG 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	<i>Environmental Protection Act 1986</i> (WA).
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA).
EPA Performance Specification 16	Performance Specification 16 for Predictive Emissions Monitoring Systems (US EPA)
H ₂ S	Hydrogen Sulfide
LNG	Liquified Natural Gas
NATA	means the (Australian) National Association of Testing Authorities
NO	Nitric Oxide

.	Definition
NO ₂	Nitrogen Dioxide
Normal Operating Conditions	means the operation of infrastructure (including abatement equipment) excluding start-up, shut-down and upset conditions
NO _x	means oxides of nitrogen, calculated as the sum of nitric oxide and nitrogen dioxide and expressed as nitrogen dioxide
NMVOCs	Non-methane Volatile Organic Carbons
O ₂	Oxygen
O ₃	Ozone
PEMS	Predictive Emissions Monitoring Systems
PM	means particulate matter
ppb	parts per billion
ppm	parts per million
premises	the premises to which this works approval applies, as specified at the front of this works approval 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.
quarterly	means once in every three months
SO ₂	Sulfur Dioxide
SO _x	Oxides of sulfur
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.
USEPA	means United States (of America) Environmental Protection Agency
USEPA Method 2	means USEPA Method 2 <i>Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)</i>
USEPA Method 6C	means USEPA Method 6C <i>Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)</i>
USEPA Method 7E	means USEPA Method 7E <i>Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)</i>
USEPA Method 10	means USEPA Method 10 <i>Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)</i>
USEPA Method 15	means USEPA Method 15 <i>Determination of Hydrogen Sulfide, Carbonyl Sulfide, and Carbon Disulfide Emissions from Stationary Sources (Instrumental Analyzer Procedure)</i>

.	Definition
USEPA Method 18	means USEPA Method 18 <i>Measurement of Gaseous Organic Compound Emissions by Gas Chromatography</i>
VOCs	Volatile Organic Carbons
W/m ²	means watt per square metre
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).

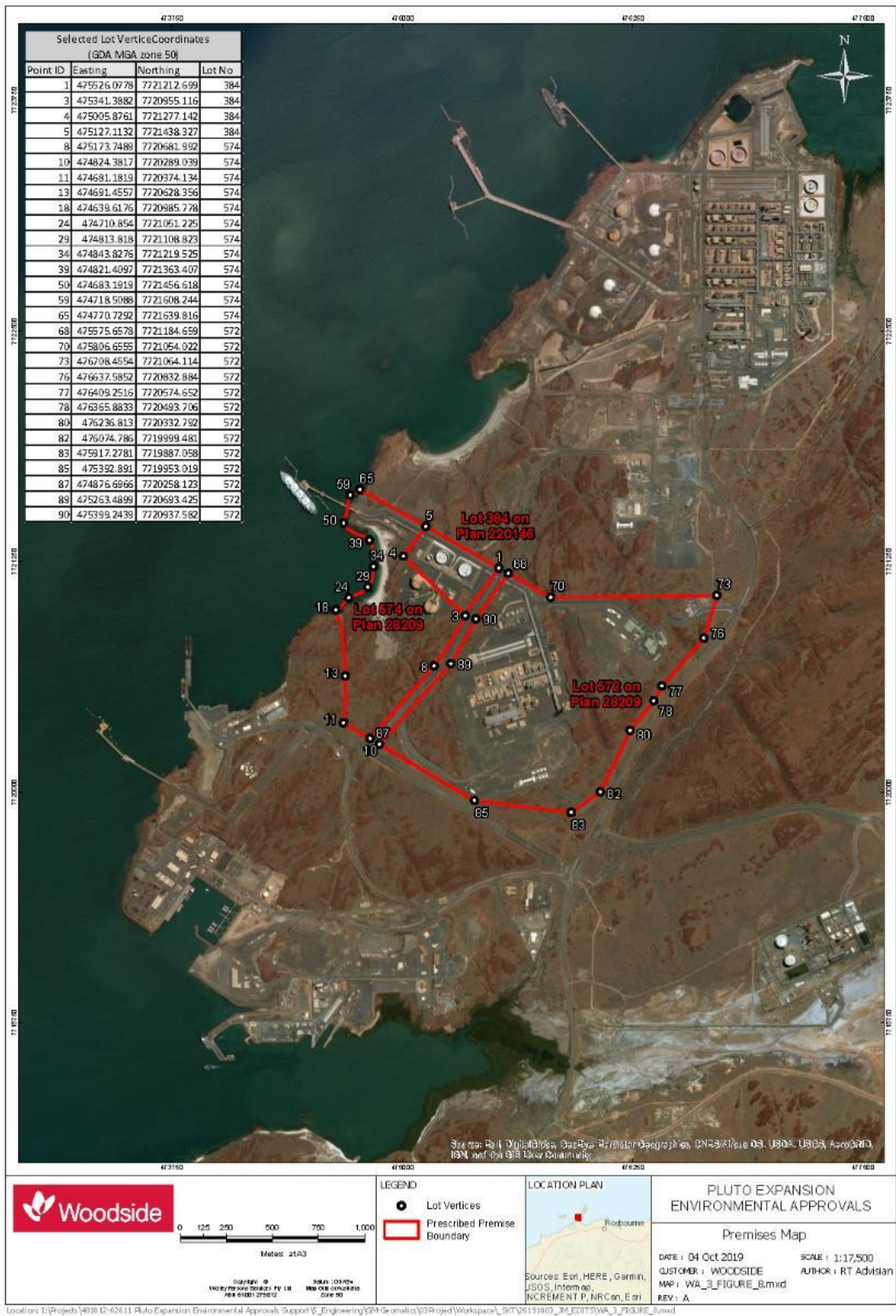


Figure 1: Map of the boundary of the prescribed premises

Premises layout

The premises layout is shown in the map below (Figure 2).

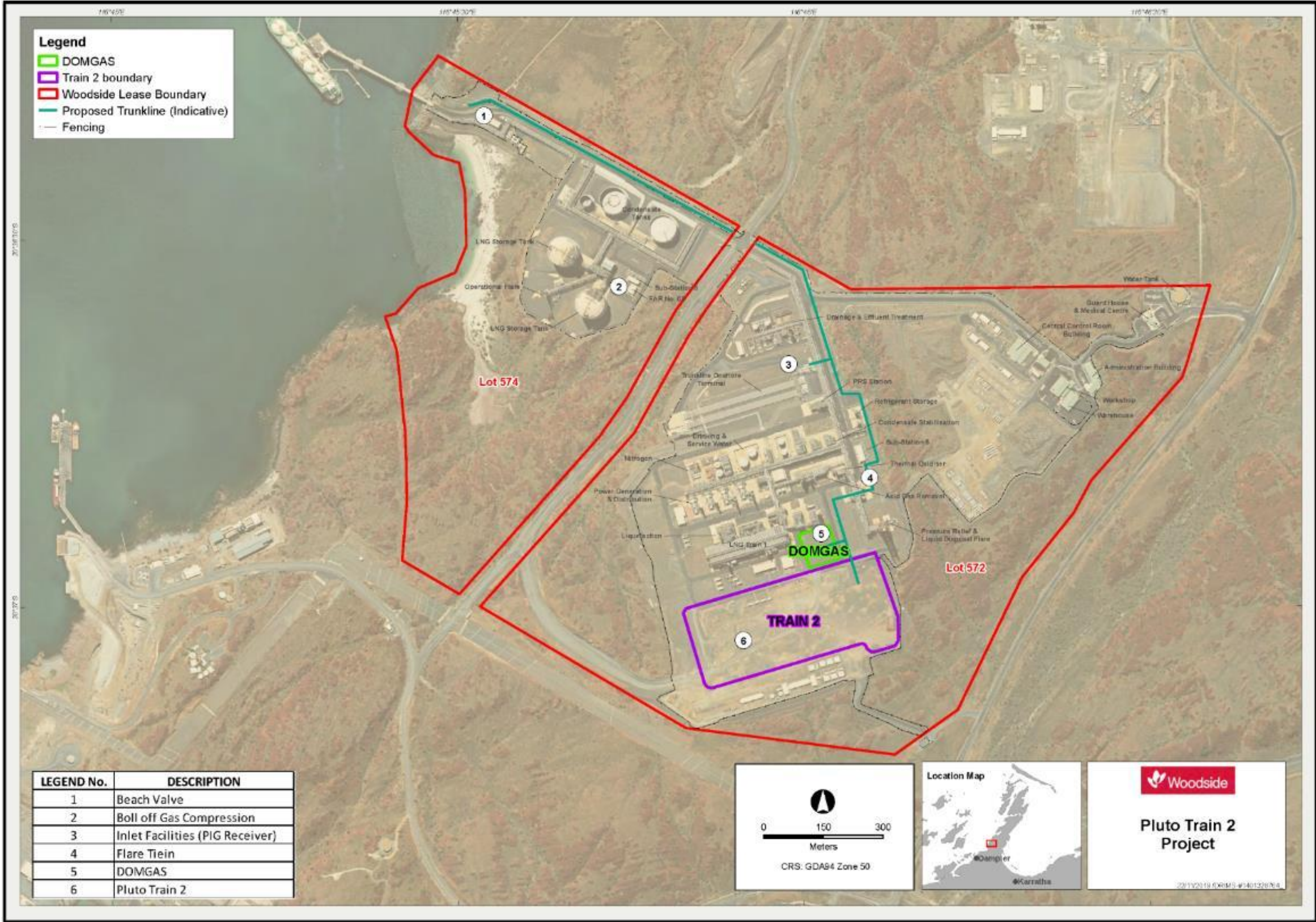


Figure 2: Premises layout

Map of emission points to air

The premises emission to air points and monitoring locations are shown in the map below (

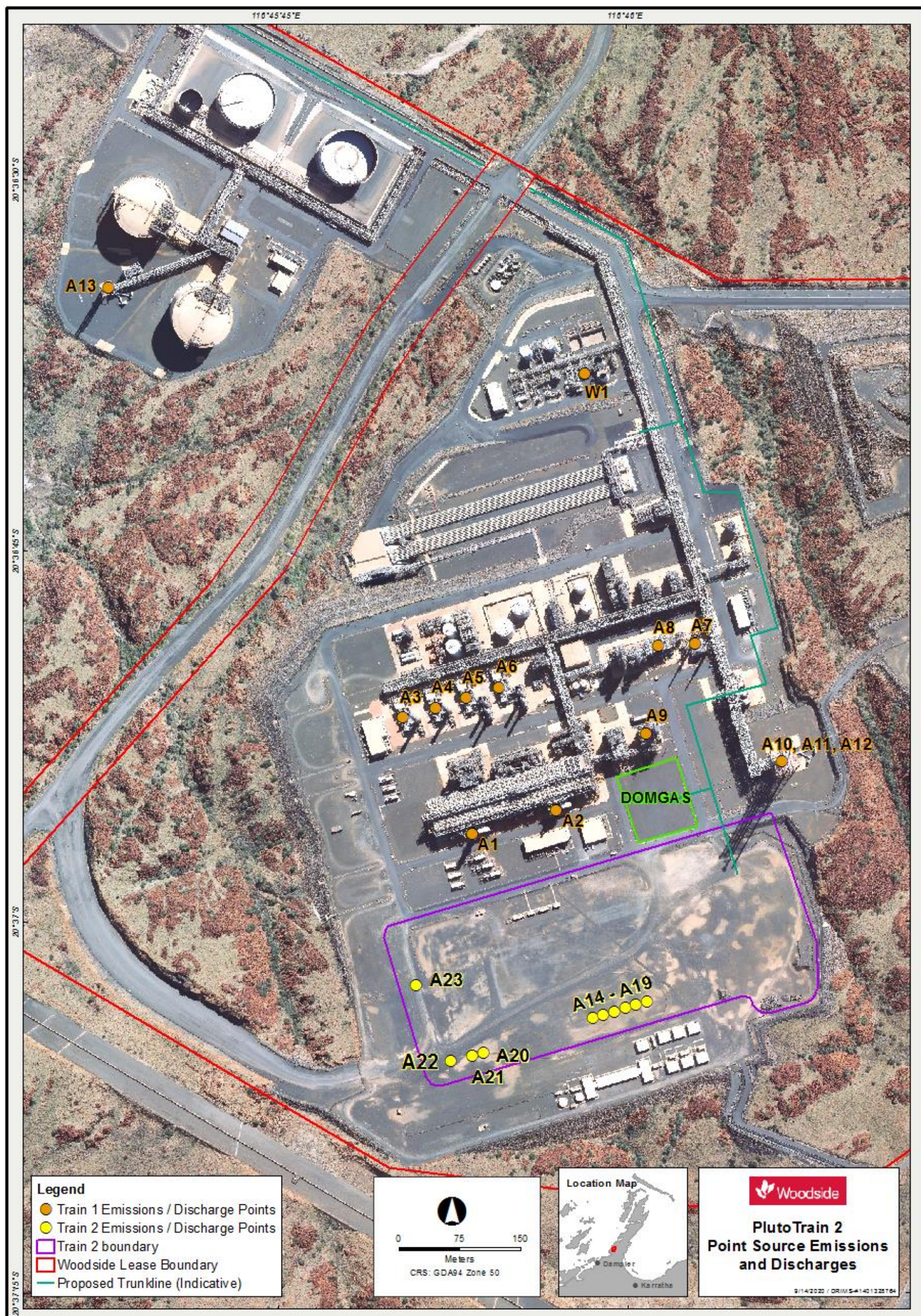


Figure 3: Map of premises emission points and monitoring locations).

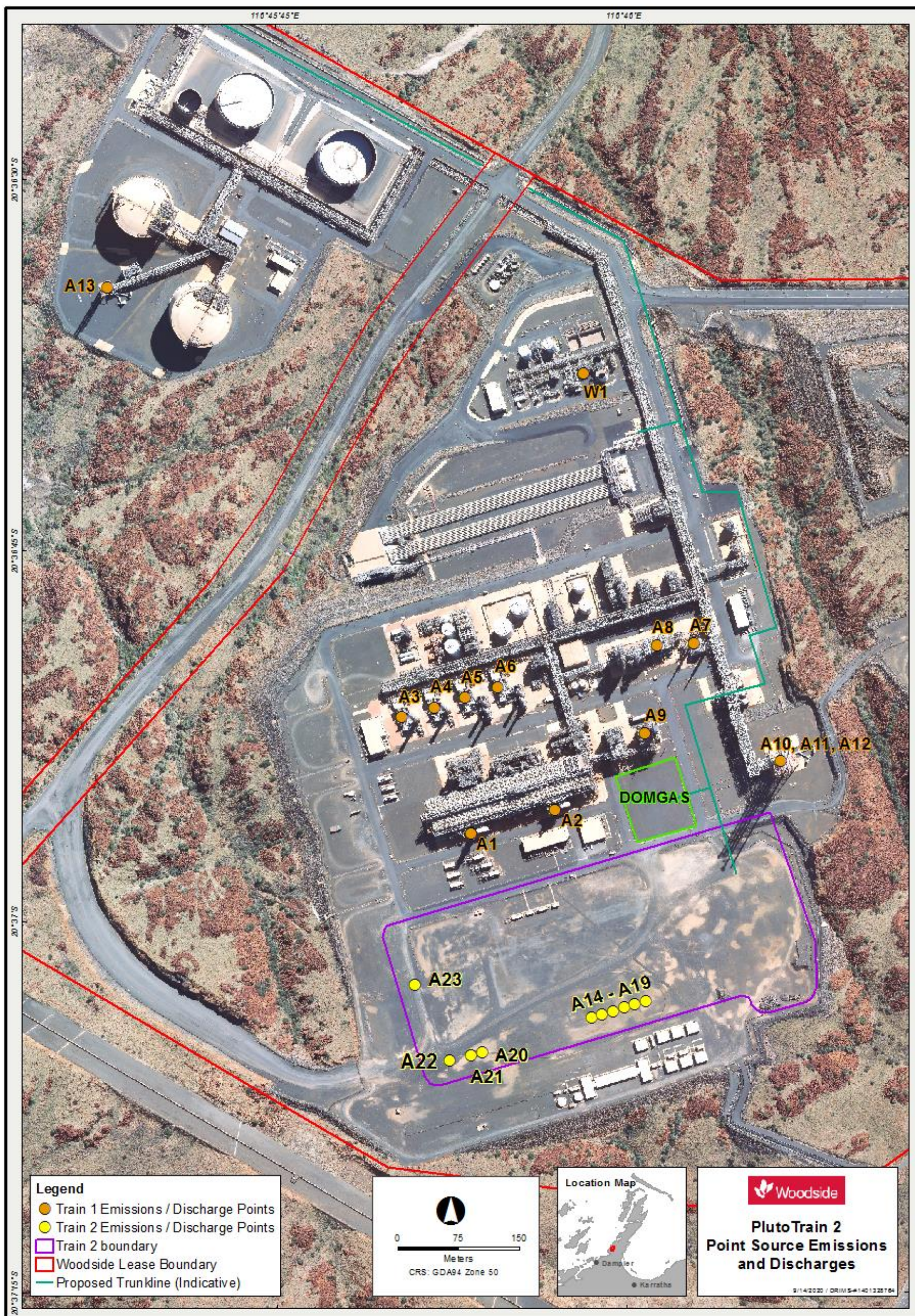


Figure 3: Map of premises emission points and monitoring locations

Ambient monitoring locations

The premises ambient air and meteorological monitoring locations are shown in the map below (Figure 4).

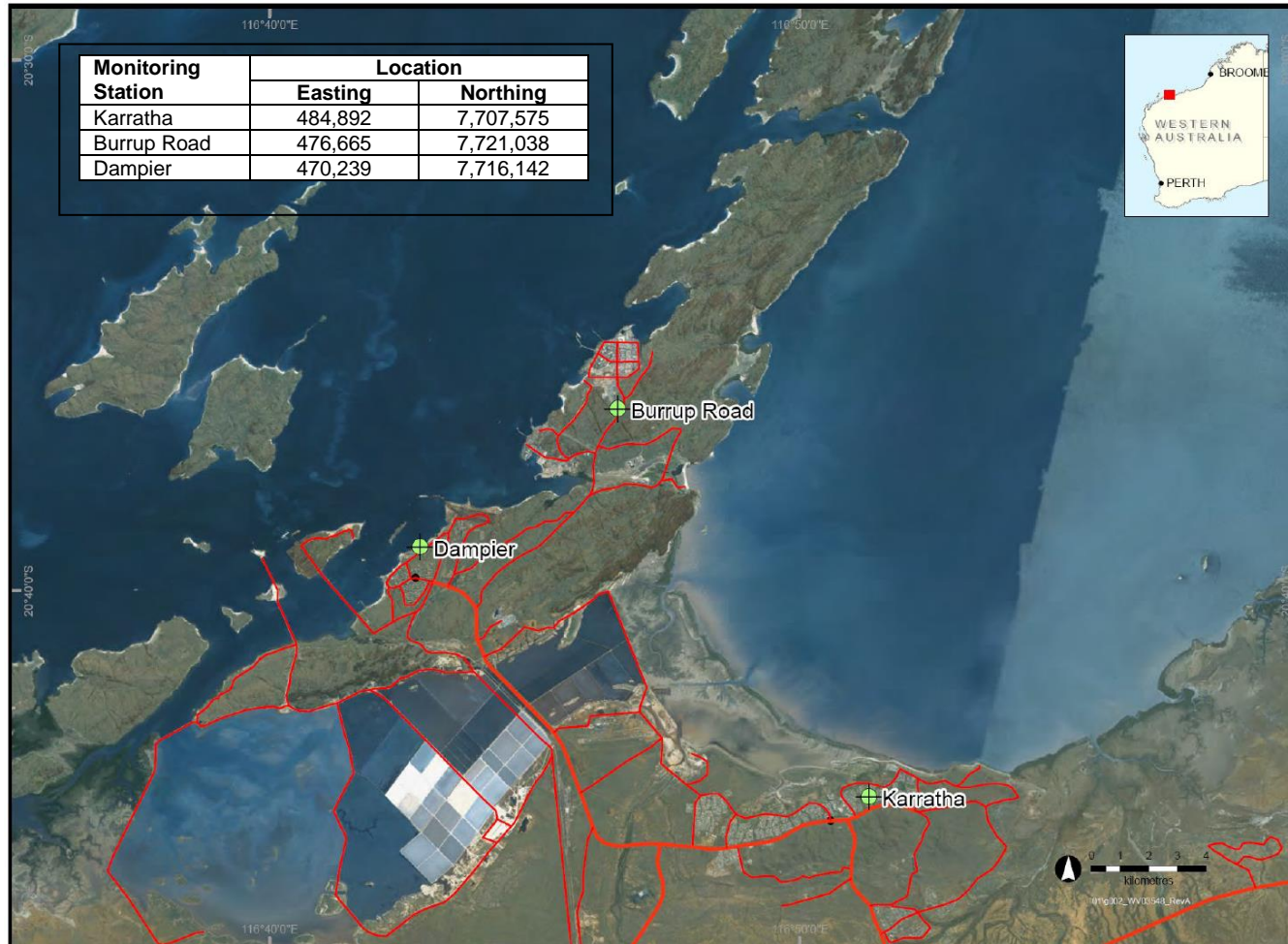


Figure 4: Map of premises ambient air and meteorological monitoring location

W6332/2019/1 (Date of issue: 26 May 2021)