Environmental Protection and Enhancement Act Approval Application: Part 1 New Plant

Synapse Data Center Project

June 20th, 2026

Site Location

NW and SW quarters of 4-4-33-1 W5

Town of Olds

Alberta, Canada

Version 1.1

Prepared for: Synapse Real Estate Corp

Prepared by: Jason van Gaal, P.Eng

Paul Cornellier, P.Eng

Glossary

Term	Definition
AAAQO	Alberta Ambient Air Quality Objectives: Regulatory limits for air pollutants used to manage and monitor air quality in Alberta.
ACC	Air-Cooled Condenser: A system that uses ambient air to condense exhaust steam, saving over 90% in water consumption compared to wet-cooled units.
AERflare	A spreadsheet tool provided by the Alberta Energy Regulator (AER) used for processing terrain data and modeling air dispersion.
APEC	Areas of Potential Environmental Concern: Specific locations where legacy contaminants may exist and require management during construction.
ASP	Area Structure Plan: A municipal framework that defines the land-use zoning and design for specific regions, such as the Northeast Quarters of Olds.
AUC	Alberta Utilities Commission: The regulatory body responsible for reviewing applications and overseeing the Participant Involvement Program (PIP).
CCGT	Combined Cycle Gas Turbine: A thermal plant design that uses both gas and steam turbines together to produce up to 50% more electricity from the same fuel.
CEMS	Continuous Emission Monitoring System: Technology used to monitor nitrogen oxides (NOx), CO2, CO, and PM2.5 directly from facility stacks in real-time.
CLI	Canada Land Inventory: A classification system for land capability; the site is primarily CLI Class 1, representing prime agricultural land.
EPEA	Environmental Protection and Enhancement Act: The provincial legislation governing industrial activities, reclamation standards, and environmental approvals.
ESC	Erosion and Sediment Control: Measures, such as silt fencing and lined reservoirs, designed to prevent unauthorized wetland disturbance and soil runoff.
GTG	Gas Turbine Generator: A turbine driven by the combustion of natural gas and air to produce electrical output (approximately 50 MW per unit in this project).
HRSG	Heat Recovery Steam Generator: An energy recovery heat exchanger that recovers heat from a hot gas stream (exhaust) to produce steam for a steam turbine.
LSA	Local Study Area: The specific geographic area, including the facility site and immediate surroundings, designated for environmental evaluation.
OTSG	OTSG - Once Through Steam Generator: A steam generation technology that produces steam directly within continuous-flow tubing systems and may substantially reduce or eliminate routine boiler blowdown requirements compared to conventional drum-type HRSG systems.
PIP	Participant Involvement Program: A public consultation process involving door-to-door campaigns, mail-outs, and information sessions for local residents.
RATA	Relative Accuracy Test Audit: An annual third-party audit conducted to verify that CEMS precision remains within the +/-10% regulatory threshold.
SCR	Selective Catalytic Reduction: An advanced active emissions control technology system that injects a liquid-reductant agent to reduce NOx emissions.
WAIR	Wetland Assessment Impact Report: A required submission under the Water Act for any project resulting in the permanent or partial loss of wetlands.
WQFR	Water Quality Flow Rate

1. Applicant Identification

1.1 Applicant Information

Synapse Real Estate Corp. is filing for approval for the construction of a 1.4 GW Natural Gas Combined Cycle Gas Turbine (CCGT) Thermal Power Plant with an attached 1 GW Data Center in the Town of Olds, Alberta, Canada.

The applicant responsible for filing the application on behalf of the company is Jason van Gaal.

2026-06-20
____
(Date)

____
(Signature)

President
(Title of Applicant)

1.2 Mailing Address of Person Responsible

Jason van Gaal
25 Chemin Ora
Saint Adolphe D'Howard
Quebec, Canada
J0T 2B0

1.3 Mailing Address of Plant

No mailing address is currently assigned to the plant as the site is in planning stages. The site location is provided below. All information can be sent to the address of the person responsible provided in section 1.2.

Olds Alberta
5;1;33;4;SW (SW-04-33-01-W5M)
5;1;33;4;NW (NW-04-33-01-W5M)

1.4 Contact on Application

All correspondence can be directed to the following:

Jason van Gaal
President
613-797-3311
jason@synapsedatacenter.com

2. Plant or Facility Identification

2.1 Main Plant Activities

Under Division 1, Schedule 1(vv) of Activities Designation Regulation, the proposed facility is classified a 1.4 GW Natural Gas-Fired “Power Plant”. The Power Plant will support a 1 GW onsite data center, which is not classified as a regulated activity.

2.2 Location

Coordinates
51°47'57.1"N 114°05'05.7"W

Legal Land Description
Olds Alberta
5;1;33;4;SW
5;1;33;4;NW

2.3 Location of Receptors

Town - The Power Plant will be located 500 m to the east of Olds, Alberta in a zoned industrial area.
Wetlands - Predominantly wetlands are situated within a 5km radius of the facility as shown in figure 2.3.1.
Highway - The facility is situated immediately to the east of Highway 2A,~3km west of Highway 2 and directly to the north of highway 27.
Residential - Highway 2A, Highway 27, and the Data Center separate the Power Plant from residential homes 500m west of the Power Plant.
Commercial - A hotel and gas station are situated 200 m from the Power Plant
Olds College - This college is located across Highway 27 from the Site Boundary.
Nearby Industrial - National Pollutant Release Inventory (NPRI) indicates there are two emitting industrial sites (Richardson Pioneer Ltd., Olds. and Trouw Nutrition Canada Inc.) within 5km. Neither facility has historically reported NO_x emissions. Additionally, the Barr-Ag Ltd. Hay and Grain Exporters Olds Facility and the Versorium Energy Corp. Netook (Olds) Natural Gas-Fired Power Plant have also been identified to be in operation within 5 km of the proposed Plant.

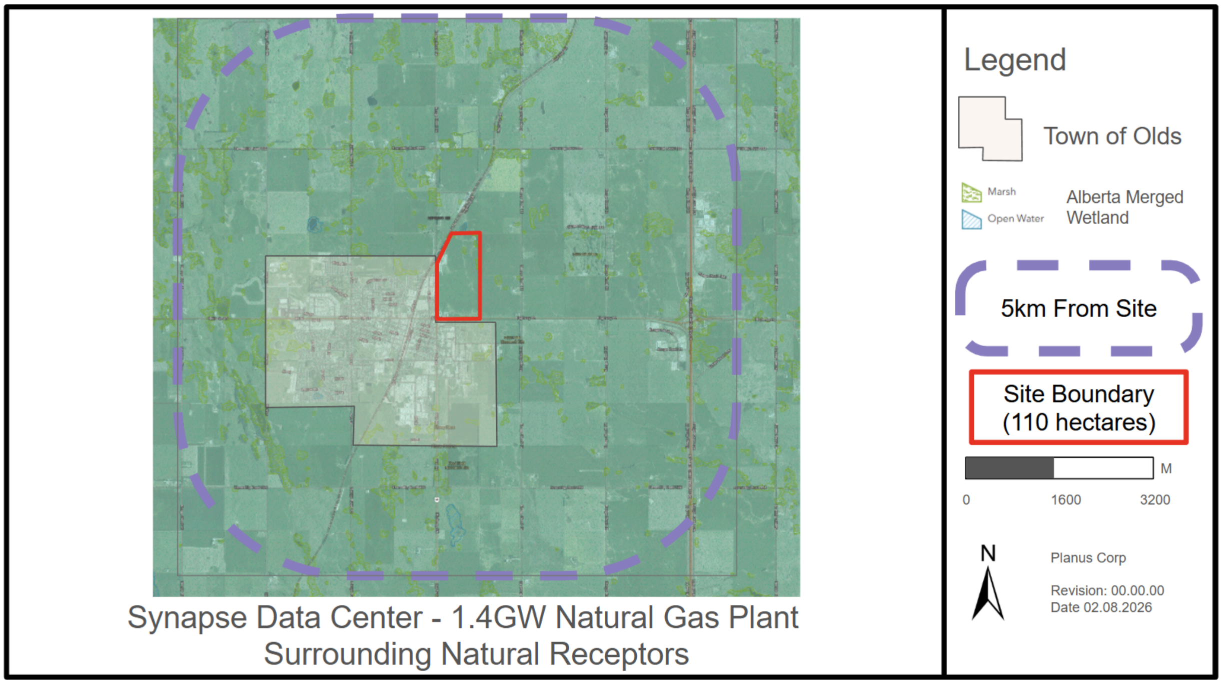

Figure 2.3.1 - Satellite Overlay of Facility

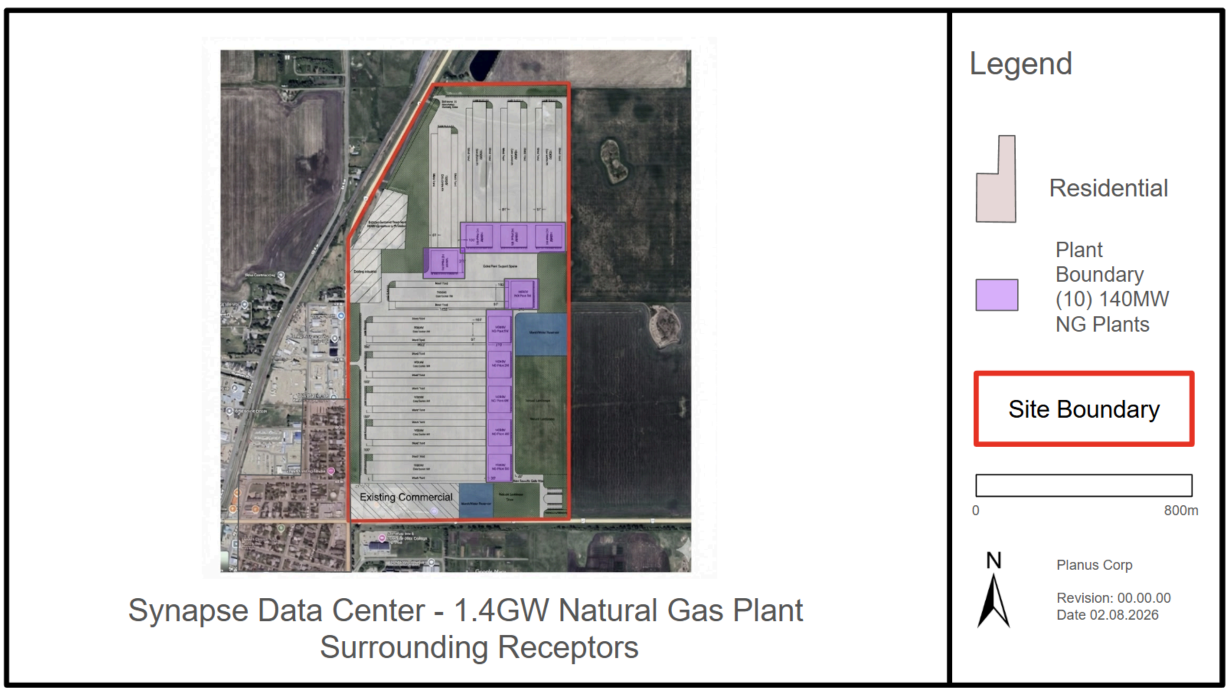

Figure 2.3.2 - Satellite Overlay of Facility Site Plan

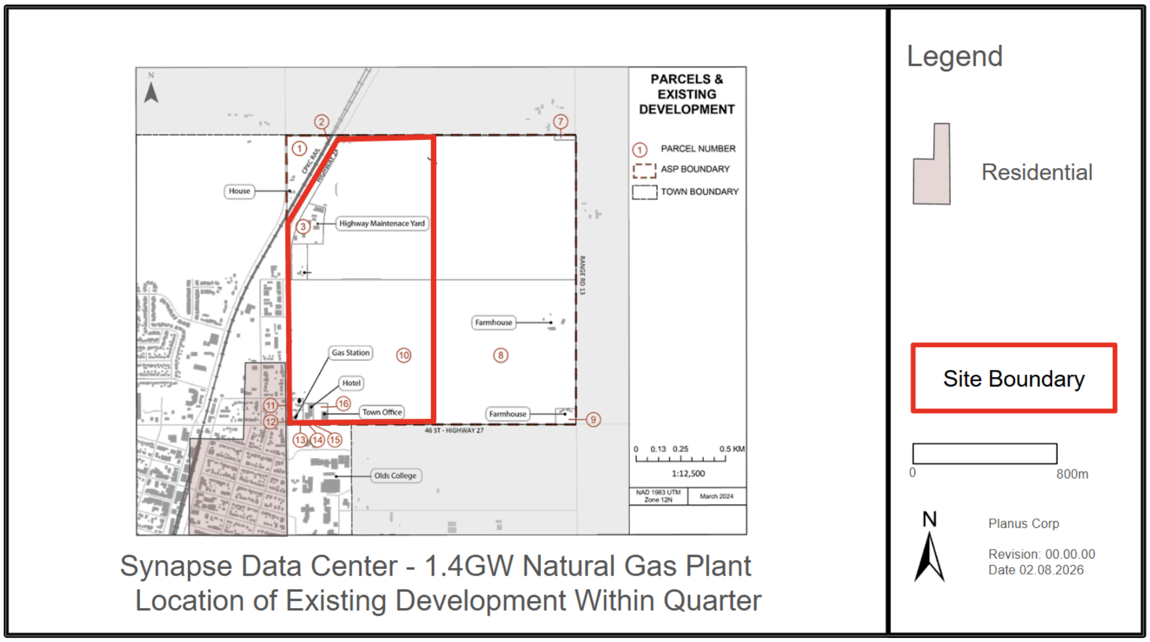

Figure 2.3.3 - Location of Existing Development within Power Plant Quarter

2.4 Power Plant Size

The 1.4 GW Power Plant is expected to occupy approximately 20 acres on 273 acres of land (<10%). The remaining 90% of land will be occupied by a 1GW Data Center and Data Center Support Infrastructure (i.e. parking lot and water reservoir for surface water runoff).

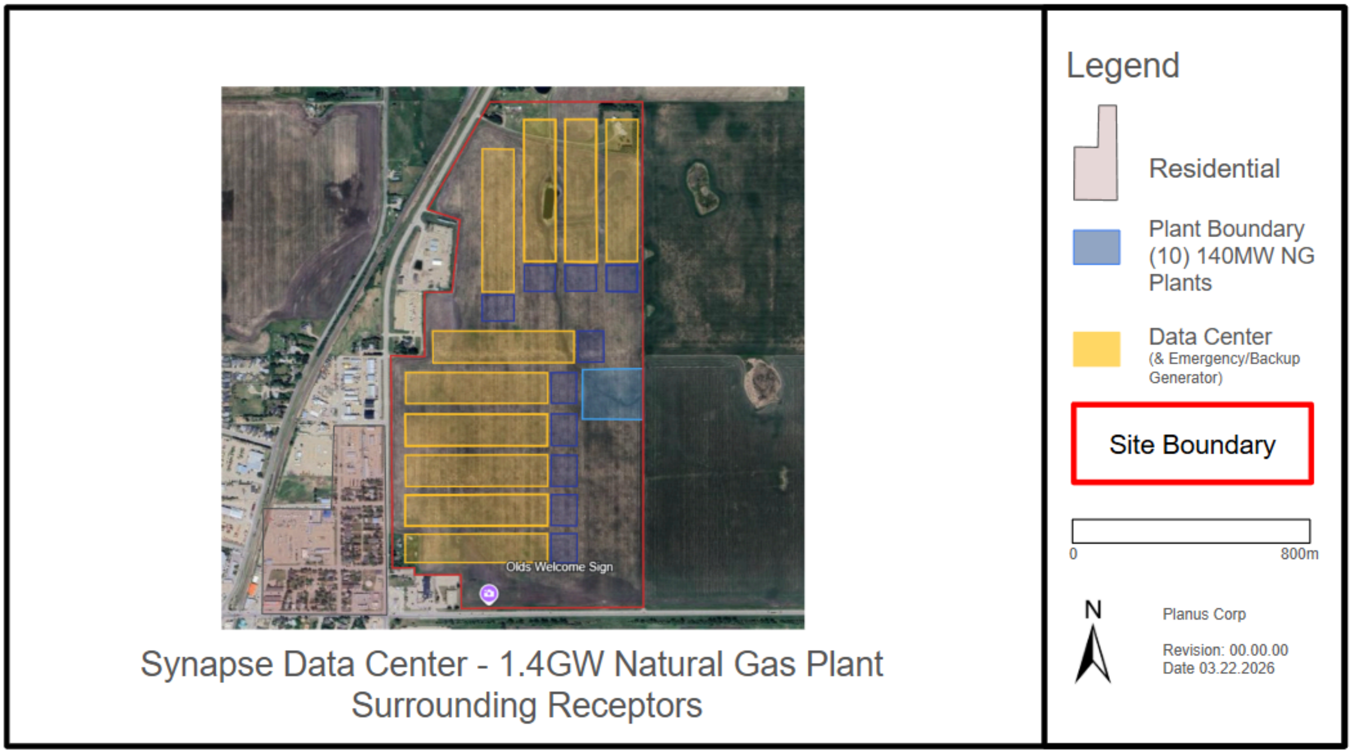

Figure 2.4.1 - Natural Gas Power Plant Location on Site Layout

Please refer to Attachment - Environmental Evaluation, Environmental Evaluation Spring Addendum, Noise Impact Assessment Report - Stage 2.0 and Air Quality Dispersion Modelling Assessment(June 12th) for additional detail on areas that have reasonable potential to be impacted outside of the site boundary.

Solstice Environmental Management completed wetland field investigations in May 2026. Wetlands located within the quarter boundary are shown in figure 2.4.2 and are expected to be predominantly designated Class D. A WAIR is being prepared for the Project. Synapse will file the ABWRET-A score information once the WAIR is complete.

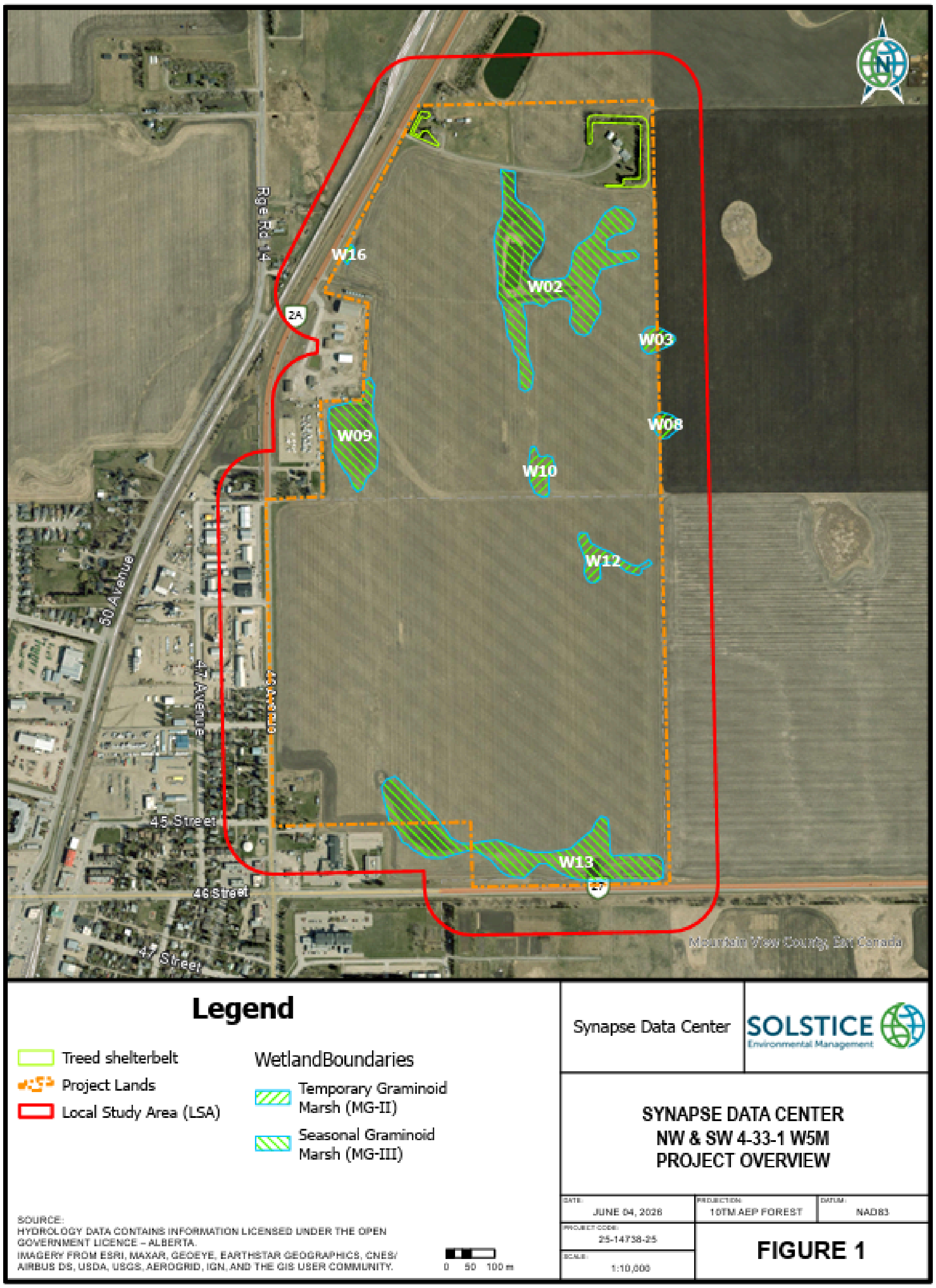

Figure 2.4.2 - Wetland Location on Site Layout

3. Project Background

3.1 Regional Initiatives and Plans

The following initiatives have been identified for the region:

- **Mountain View County Municipal Development Plan (MDP).** The Mountain View County MDP update was adopted in 2020. This MDP is a tool for managing growth and development and includes policy direction for land use activities within the County. The MDP is intended to provide direction and guidance for the County's decision-making authorities when considering specific issues relating to land use or development proposals. The MDP is also a strategic document that provides the County with direction and guidelines on matters of social, economic, and environmental importance.
- **Red Deer Region Land-Use Framework.** The goal of Land-Use Framework is to sustain the economy in Alberta, while balancing the economy with the social and environmental goals of Albertans. A cumulative effects management approach is used in regional plans to manage the combined impacts of existing and new activities within the region. The Province of Alberta is divided into seven regions in order to develop a Land-Use Regional Plan for each area;the Plant is located in the Red Deer Region. This region has approximately 5033751ha in total. The Red Deer Region is bordered by the Alberta-Saskatchewan border to the east, goes to the westerly edge of Mountain View County, south of Iddesleigh and to the most northerly boundary of Ponoka County. It should be noted that development of the Land-Use Framework Plan for this region has not yet commenced.
- **Municipal and Land Use Framework** - The municipality of Olds completed an Area Structure Plan (ASP) for the North East Quarters of town (link). The area has been zoned for light Industrial use and is specifically approved for Data Center discretionary use.
- **Watershed Management Plan for the Red Deer River Watershed.** The Red Deer River Watershed is home to approximately 300,000 people and covers an area of 49,650 km2 in Central Alberta. In alignment with Alberta's Water for Life Strategy (2003) and the product of extensive community engagement and research, this watershed management plan presents a set of goals, targets, and recommendations to maintain and improve surface water and groundwater quality in the Red Deer River watershed. The Plant will be located within the Red Deer River watershed..
- **Water Management Plan** - The ASP provides a design framework for both storm and domestic water connection with municipality services. The project will be connected to municipal water and sewage. Surface water runoff will accumulate in a lined water reservoir sized to allow for evaporation.The reservoir will be equipped with oil separation and monitoring in the event of contamination and sized for 1:100 year rain events. The reservoir is being installed in a location that

is consistent with current surface waterflow. In the event of non-contaminated overflow, the reservoir is intended to allow water to enter the existing natural water course.

- **Management Frameworks** - An emergency response plan is being developed in close coordination with the Town of Olds, local fire department and Olds Hospital and Care Center. An initial Environmental Protection Plan has been developed in accordance with best practices and in coordination with the site specific Environmental Evaluation.

3.2 Hearing Results

No hearing results available at this time.

3.3 EIA Acceptance

Synapse obtained a letter from Karen Tomashavsky of AEPA dated March 3, 2026 confirming that no environmental impact assessment report is required in respect of the Project.

3.4 Authorizations

Municipal - The city completed a minor bylaw amendment for both quarters, completing full zoning in accordance with NE ASP on February 9th, 2026. A letter from the Town of Olds in support of the project, is provided in Attachment Municipal Engagement Form.

AUC - The AUC Participant Involvement Program started January 26th, 2026 and was completed on April 3rd, 2026. The application was submitted on April 3rd, 2026 (Proceeding 30732).

Alberta Wetland Policy (Water Act) - Development of the Project will require the permanent removal of all existing wetlands from within the Project lands. All impacts to wetlands will require a Water Act approval for wetland disturbance, which will require submission of a Wetland Assessment Impact Report (WAIR). Permanent loss of wetland area will require replacement in accordance with the Alberta Wetland Policy.

Other Submissions - Refer to Table 12 in Environmental Evaluation for list of other environmental policy/legislation that will be adhered to as part of the project.

3.5 EPEA Application Coordination

No anticipated coordination is required with other plants or facilities.

3.6 Financial Security

The requirements for financial security are being discussed as part of AUC Proceeding 30732 as follows:

“Based on the current Decommissioning and Reclamation Plan (DRP) prepared by independent experts (Exhibit 30632-X0010 TP 30 - Decommissioning Plan), the estimated reclamation security amount for the Project is $290,009,921 CAD (2026 dollars). This value represents the AACE Class 5 high-range estimate (inclusive of direct costs, indirect costs, and a 30% contingency allowance) identified within the DRP.

Under Synapse's proposed phased reclamation security funding approach, reclamation security will be posted in accordance with the following schedule:

- Year 10: $72,502,480 (25%)
- Year 15: $145,004,961 (50%)
- Year 20: $217,507,441 (75%)
- Year 25: $290,009,921 (100%)

The estimated reclamation security amount will be reviewed and updated periodically to reflect new information as it becomes available, including revisions to the decommissioning liability estimate, inflation, facility modifications, and any changes to applicable regulatory requirements.”

3.7 Project Timeline and Consultation

At the time of AUC permit application on April 3rd, 2026, schedule is as follows:

1. AEPA Application(review for completion) - February 19th, 2026
2. Development Permit Application – April 2026
3. AUC Application - April 2026
4. AEPA Approval – July 2026*
5. AUC Approval - September 2026*
6. Development Permit Issuance –June 2026*
7. Construction Start – 15 days following AUC approval**
8. Commercial Operation Date – Four to six months following AUC approval for first 100MW Data Center and attached Power Plant

*Anticipated
**Subject to financing

Construction
The project schedule construction start date will vary based on customer contract signing. The schedule below assumes the customer contract is signed on February 15th, 2027. The schedule will be adjusted as required pending any permit or customer delays.

The data center and natural gas power plant may be constructed under separate timelines that ensure adherence to all permitting requirements.

Data Center
The following is an example schedule for the first 100 MW Data Center. Each subsequent data center will start in one month increments thereafter until the 1 GW Data Center Campus is complete.

March 2027 - Construction Ground Works and Foundation
April 2027 - Construction Shell
May 2027 - Interior Fitup
June 2027 - Equipment Installation
July 2027 - Commissioning
July 2027 - Onwards - Data Center Operation Ready

Natural Gas Plant Construction and Full Commissioning
The natural gas power plant is expected to be completed 2 months following the data center in one month increments of 140MW.

Alberta Wetland Adherence
The established in Environmental Evaluation “If construction and earthworks commence prior to Water Act approval, a setback of at least 10 m will be established around the preliminary wetland boundaries to mitigate against any unauthorized wetland disturbance. Appropriate ESC measures will be in place around the setback boundary to ensure no unauthorized wetland impacts prior to Water Act approvals.” See section 6.2 for additional information.

3.8 Public Consultation

AUC Consultation Process An extensive AUC Participant Information Program was conducted as follows:

<800 m Door to Door Campaign

An in-person Participant Involvement Program (PIP) program was conducted starting January 26th, 2026. Over 700 residences were identified within the 800 m range of the property boundary. A door-to-door campaign was conducted on all residences, with first visits occurring by January 29th, 2026. 70-75% of the residences within the 800 m range were spoken to in-person during the campaign. In an effort to improve our ability to contact local residences, contact was attempted at different times of day during the week and on weekends. Any residences we were unable to reach after three visits had a package left at their home.

<2000 m Mail Out Campaign

A mail out PIP program was performed, sending out over 1400 packages to all individuals within 2000m of the property boundary. This included all landowners that were not listed as tenants in the <800m range. Mailouts were completed on January 28th and 29th, 2026. The week of June 8th, additional packages were mailed to landowners within the 800 to 2000m range due to an administrative error.

Media Coverage

The project has garnered considerable media attention. Interviews have been conducted at the local radio station, CTV, CBC News, and Global News informing people of the project.

Website

A website with the PIP package and answers to commonly asked questions has been created and is referenced in the PIP package to help individuals stay current on any new information that becomes available https://synapsedatacenter.com/auc_page/. On March 3rd, 2026 a website was launched https://synapsedatacenter.com/we-are-listening with video content on the Project created to help answer the most commonly asked technical questions.

In Person Information Session

The town of Olds conducted two in-person information sessions on February 4th, 2026 with over 200 attendees. Synapse Real Estate Corp. conducted an in-person information session with ~300 attendees on February 5th, 2026 with a second open house held on April 1st. In person and small group sessions have also been held as part of ongoing consultation and engagement.

EPEA Notice

Notices will be published in local newspapers in accordance with application requirements.

Themes of Concern
The themes of the key concerns raised during consultation and engagement include the following:

- Change of Land Use
- Noise Impacts
- Air Impacts
- Water Usage
- Post implementation monitoring
- Traffic implications

Addressing Concerns
Concerns are being addressed through email, phone, and in-person communication.

4. Current Setting for the Proposed Project and its Environmental Condition

4.1 Current Setting and Condition of the Environment

- **Local and Regional Landscape:** The project site is located in the **Central Parkland natural subregion** of Alberta. The topography is gently rolling, with an overall slope to the south and southeast. Elevations range from a high point of **1044 mASL** in the southwest corner to a low point of **1029 mASL** in the southeast corner.

- **Drainage and Surface Watercourses:** There are no natural defined waterbodies or watercourses within the Local Study Area (LSA). An **ephemeral draw** runs north to south through the central part of the northwest quarter (NW-4-33-1 W5). Surface drainage flows south under Highway 27 toward an unnamed Order 1 tributary of Lonepine Creek. Existing features include one confirmed wetland (seasonal graminoid marsh) containing a dugout, and several potential temporary wetlands that have been impacted by historical cultivation.

- **Groundwater:** Depth to groundwater ranges from **2.35 m to 4.19 m** below grade. Inferred flow direction is to the southeast, following regional topography. Recent testing indicates that groundwater conductivity, chloride, and sodium levels meet Tier 1 Guidelines at Data Center Site 1W.

- **Land Use and Zoning:** Current land use is predominantly **agricultural** (crops, livestock corrals, and shelters) with two existing residences. The land is currently zoned for industrial use.

- **Site Adjacent Lands**: See Figure 2.3.3 for site adjacent land use

4.2 Current Ambient Air Quality and Environmental Pressures

- **Topography and Elevation:** The site has gently rolling elevation (1029–1044 mASL) and its position in the Parkland environment influences local dispersion. Winds are predominantly from the west-southwest. Terrain data were obtained and processed using the Alberta Energy Regulator (AER) AERflare.v305.250828 (AERflare) spreadsheet.
- **Ambient Air Monitoring Data:** See Attachment Air Quality Dispersion Modelling Assessment(June 12th) section 2.4
- **Constraints and limiting factors:** See Attachment Air Quality Assessment section 2.4
- **Environmental Influences and Pressures (5-km radius):** See Attachment Air Quality Dispersion Modelling Assessment(June 12th) section 2.3

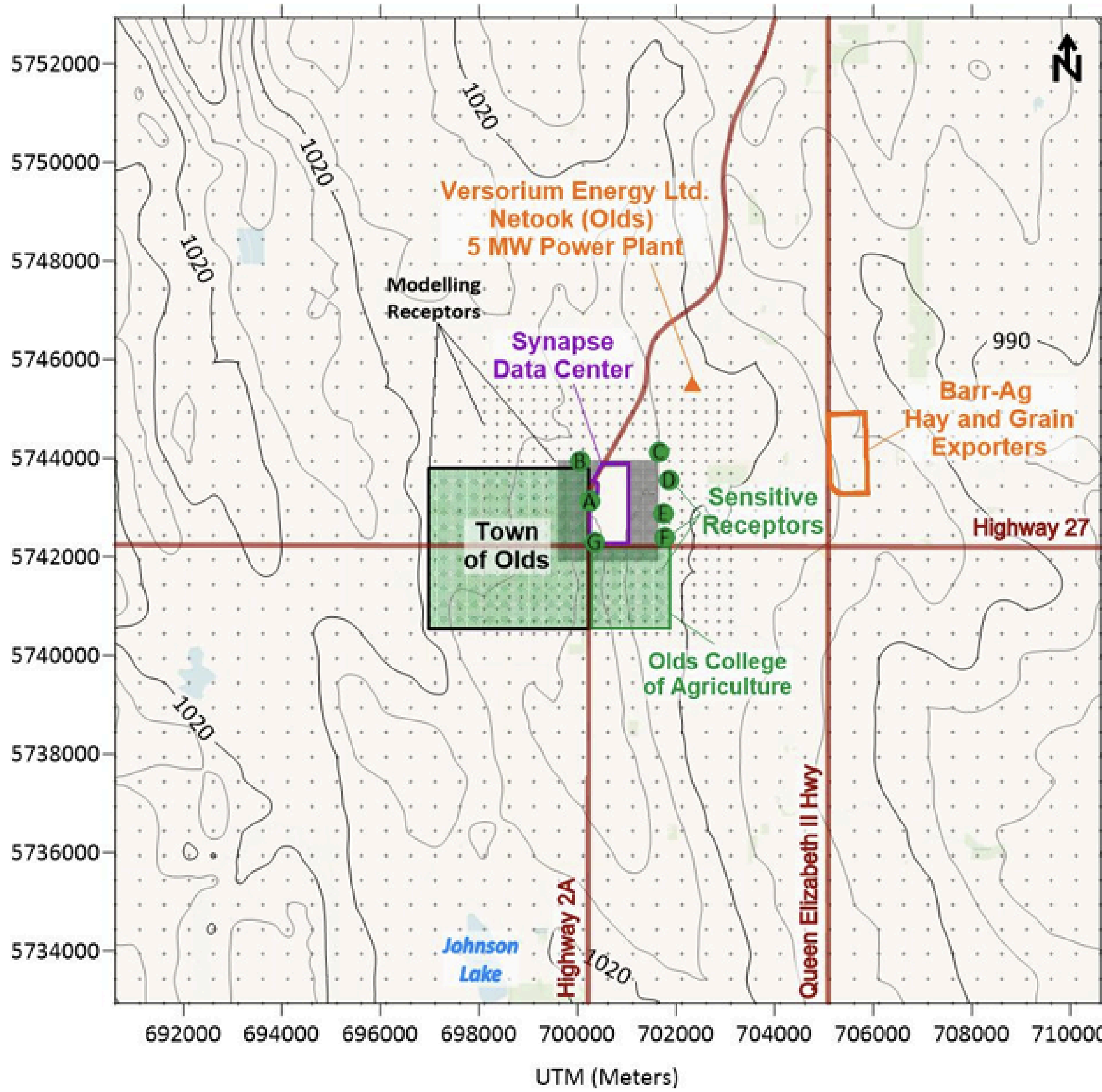

Figure 4.2.1 -Location of emission sources within 10km of the Plant location.

4.3 Soil, Land Survey, and Vegetation

- **Land Capability and Soil Classification:** Soils are classified as **Canada Land Inventory (CLI) Class 1**, representing prime agricultural land with minimal limitations for crop production. The dominant soils are **Black Chernozems**. Specific soil series identified include the **Antler** (Orthic Black Chernozem), **Lonepine** (Orthic Gray Luvisol), and **Didsbury** series (see Attachment Environmental Evaluation - Table 3).

- **Soil Monitoring and Quantity:** Borehole sampling in January 2026 found topsoil depths ranging from **25 mm to 200 mm**.

- **Anthropogenic Effects:** The soil has been significantly disturbed by long-term agricultural activities, including **cultivation and compaction**. Portions of the site are designated as "misc. disturbed land" as a result of residential and agricultural infrastructure.

- **Suitability for Reclamation:** While the soils are high-quality Class 1, project construction will involve extensive stripping and regrading, leading to a **permanent loss of soil quantity** and biological function for agricultural use. No significant chemical or physical constraints to handling were identified, but the project is intended as a permanent industrial facility.

- **Vegetation Types:**
  - **Predominant Types:** Agricultural crops and small patches of grasses/weeds.
  - **Timber/Shelterbelts:** Mature planted shelterbelts include **Spruce** (*Picea sp.*), **Jack Pine** (*Pinus banksiana*), and **Balsam Poplar** (*Populus balsamifera*).
  - **Rare Vegetation:** An ACIMS search identified **no rare element occurrences** in the LSA.
  - **Weeds:** Observed "Noxious" weeds include **Perennial Sow Thistle** and **Canada Thistle**.
  - **Anthropogenic Effects:** Vegetation is highly disturbed by clearing for agriculture and the introduction of non-native species. **Clubroot**, a soil-borne agricultural pest, is a known concern in the surrounding Mountain View County.

Soil and Vegetation Assessments were performed as part of the Baseline Environmental Assessment conducted by Solstice for the region surrounding the proposed Plant location (see Attachment Environmental Evaluation and Environmental Evaluation Spring Addendum.

4.4 Pre-Disturbance Setting and Environmental Condition

- **Reclamation Outlook:** The project is designed as a **permanent facility**; however, standard soil salvage and management measures are required to minimize loss and support potential beneficial reuse if industrial uses are ever discontinued.

See Attachment Environmental Evaluation

4.5 Wildlife and Habitat Condition

See Attachment Environmental Evaluation

4.6 Receiving Environment and Receiving Watercourses

For existing Surface Water Hydrology and Wetland characteristics refer to Attachment Environmental Evaluation Section 3.2.1 and 3.4.1 and Environmental Evaluation Spring Addendum.

It is expected that Water Act approval will be obtained to relocate all wetlands. Setback during construction must be at least 10m until this approval is received.
Figures 4.6.1 and 4.6.2 present wind data obtained from the Alberta Environment and Protected Areas (AEPA) Weather Research and Forecasting (WRF) Meteorological Data Repository. The data cover the period from 01-Jan-2015 to 31-Dec-2019 and are centred on the geographical point at 51.802 N and 114.090°W. As indicated in the windrose presented in Figure 4.6.1, the predominant hourly-average winds are from the west-southwest. Figure 4.6.2 presents the wind class frequency distribution, indicating that wind speeds in the range of 2.1 to 3.6 m/s are most common in the region.

Temperature data from the Olds Monitoring Station are provided in Figure 4.6.3. The Olds Station is located ~2.2 km south-southwest of the Plant. The data are for the years 1981 to 2010. As indicated in Figure 4.6.3, the daily average temperatures range from -8.7 to 15.6°C. The average maximum daily temperatures range from -3.0 to 21.9°C. The average minimum daily temperatures range from -14.3 to 9.4°C. The extreme minimum and maximum temperatures on record are -43.9 and 37.2°C, occurring in January and July, respectively.

Figures 4.6.4 and 4.6.5 present a summary of historical precipitation data from the Olds Monitoring Station for the years 1981 to 2010. As indicated in Figure 4.6.4, the maximum 24-hour precipitation during the most recent period available from Olds (1981 to 2010) is 104 mm. The summer months have the highest volume and number of days with precipitation.

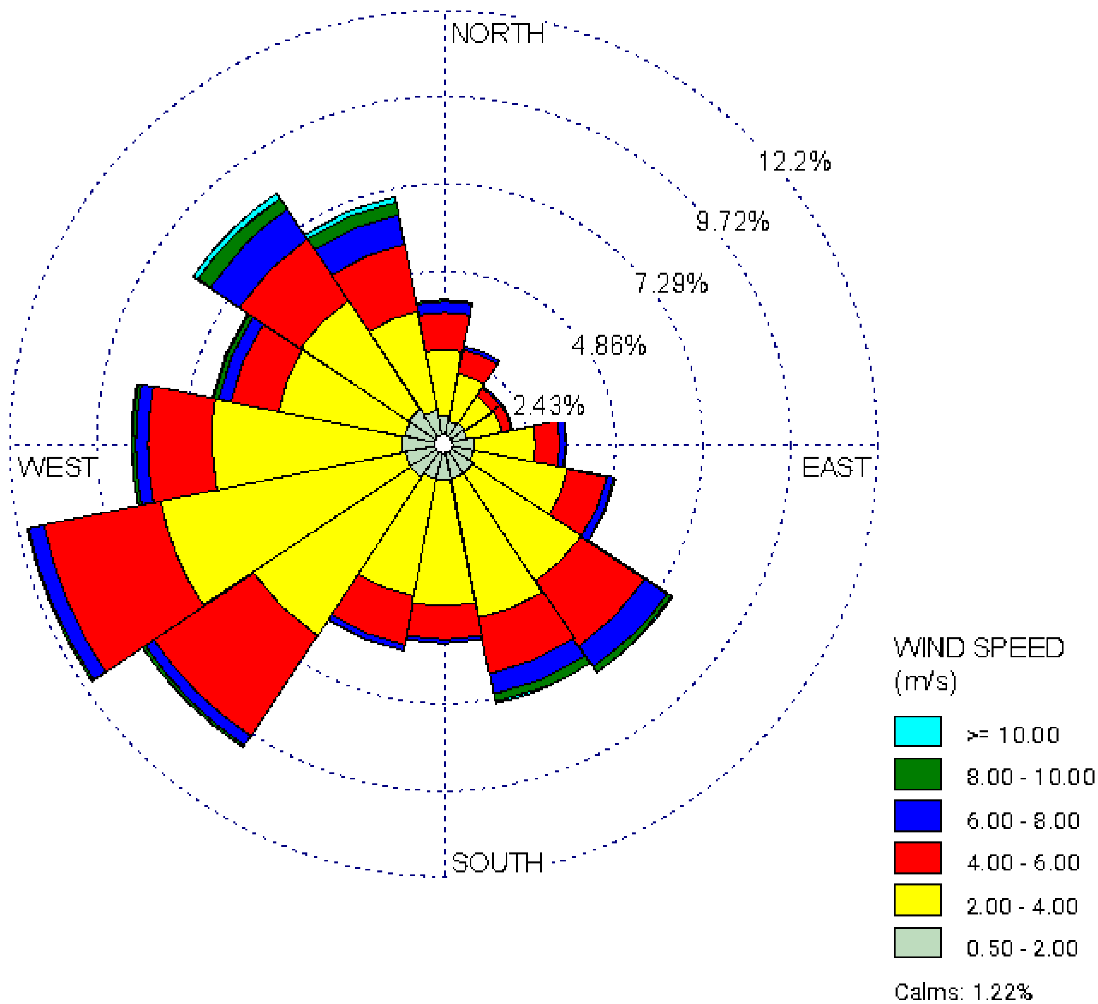

Figure 4.6.1 Windrose showing wind data obtained from AEPA WRF Data Repository.

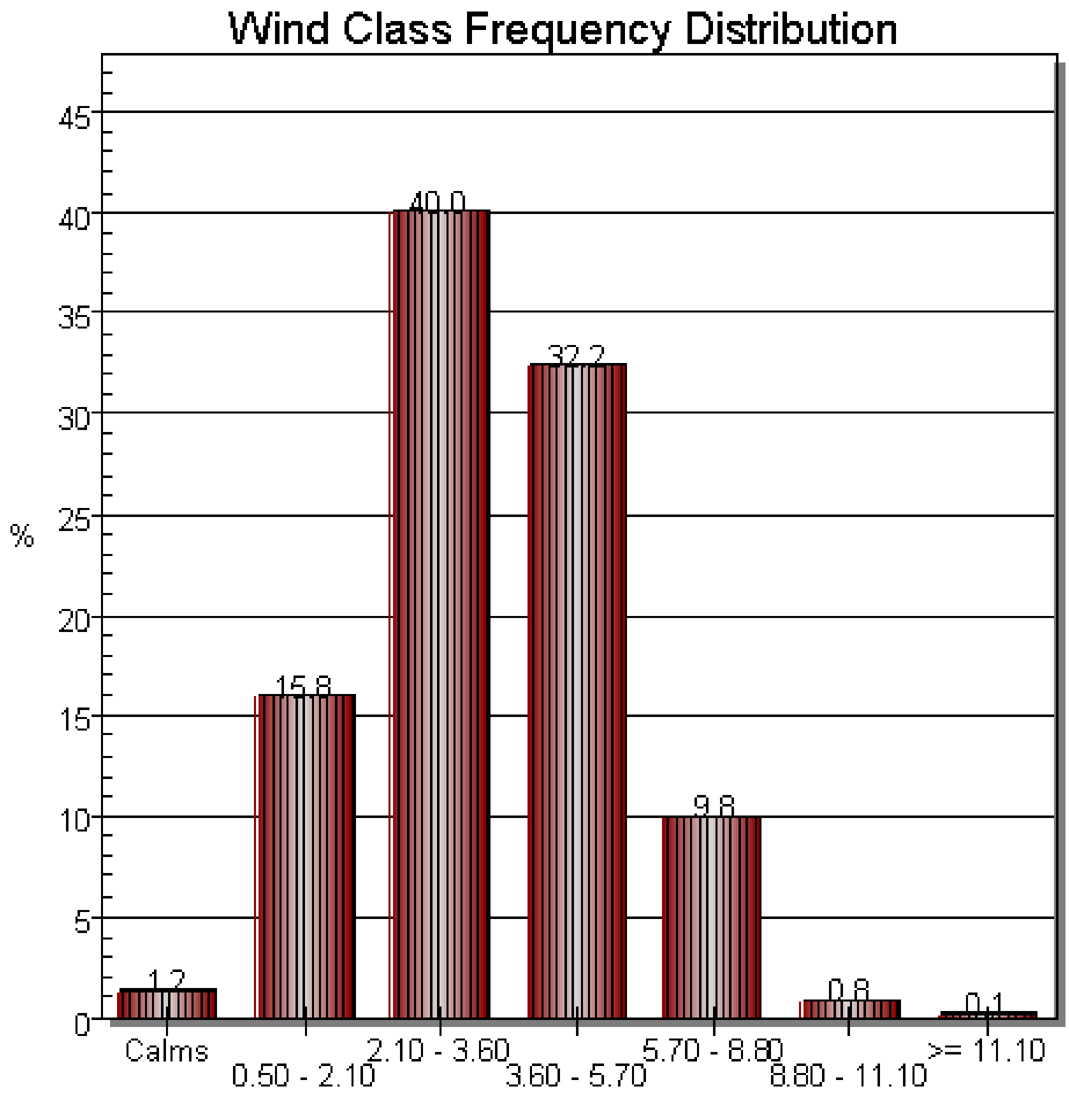

Figure 4.6.2 Wind class frequency distribution showing wind data obtained from AEPA WRF Data Repository.

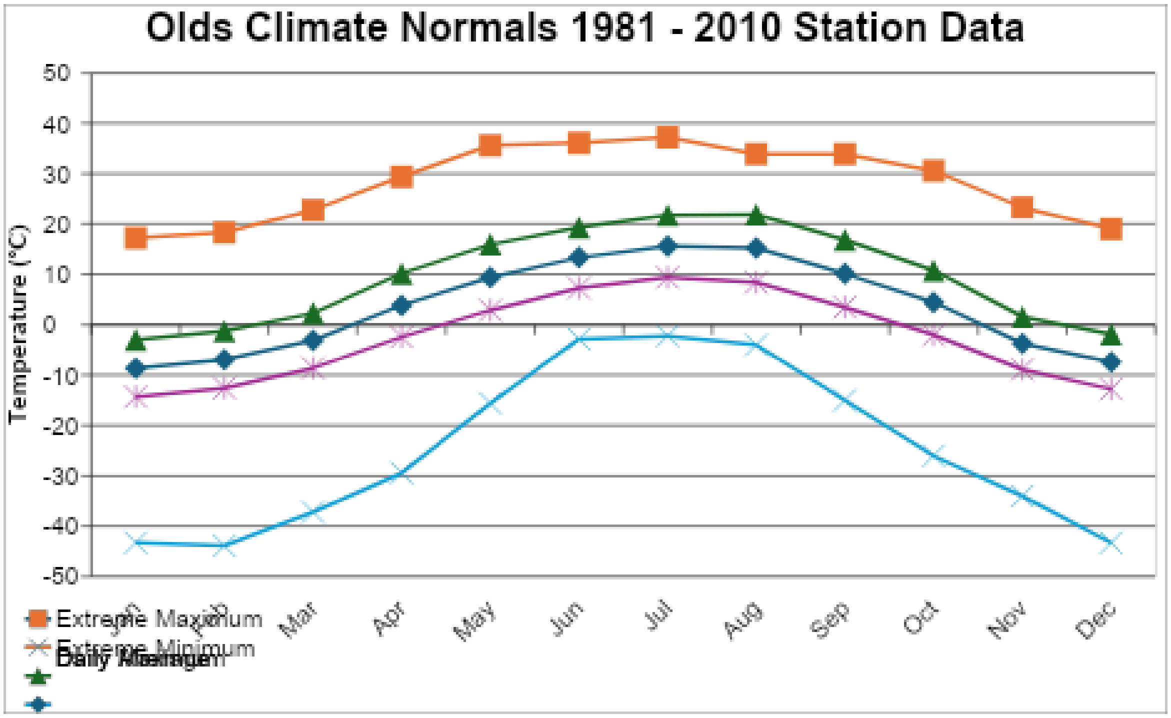

Figure 4.6.3 Minimum, mean and maximum daily temperatures by month and monthly extreme temperatures as measured at the Olds Monitoring Station (1981 to 2010).

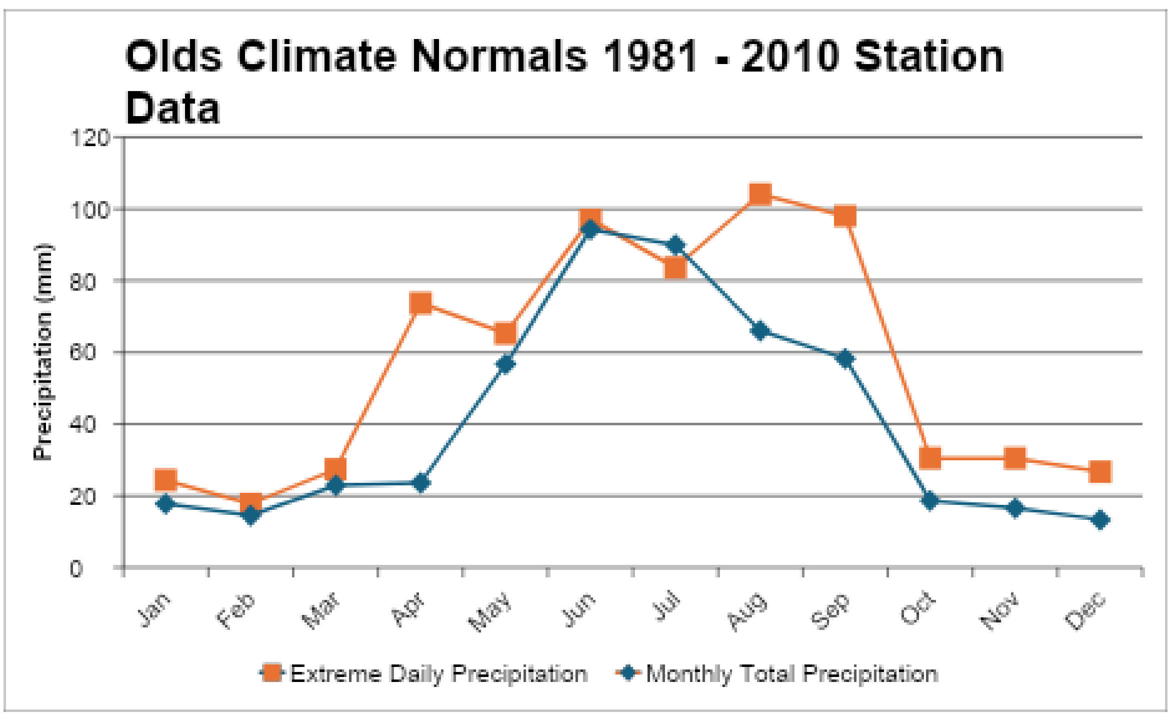

Figure 4.6.4 Summary of monthly average total and extreme daily precipitation as measured at the Olds Monitoring Station (1981 to 2010).

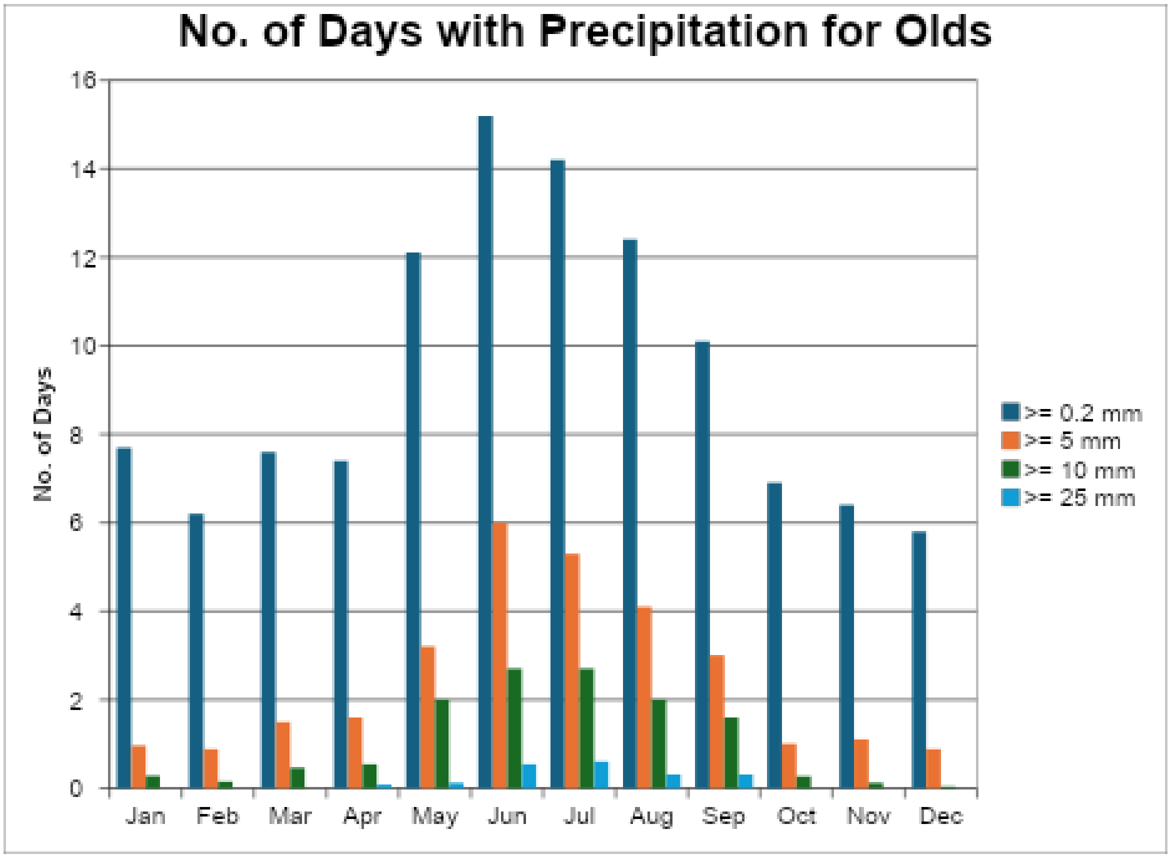

Figure 4.6.5 Summary of number of days with precipitation as measured at the Olds Monitoring Station (1981 to 2010).

4.7, 4.8, 4.9, and 4.10 Irrigation Sustainability Pre-Assesment

See Attachment Environmental Evaluation. The facility will not use waste application or wastewater irrigation.

5. Plant or Facility Design

The Project incorporates a combined-cycle generating system utilizing gas turbine generators (GTGs), steam generation equipment, Selective Catalytic Reduction (SCR) systems, and steam turbine generators (STGs). Synapse is evaluating two steam generation technologies for application within the Project - conventional Heat Recovery Steam Generators (HRSGs), and Once-Through Steam Generators (OTSGs). Both technologies are technically capable of supporting the Project's combined-cycle operating objectives and remain under consideration as part of the ongoing detailed engineering process.

The HRSG configuration represents a conventional combined-cycle design and forms the basis for much of the preliminary engineering completed to date. The OTSG configuration has recently emerged as a commercially available alternative that may provide significant environmental, operational, constructability, and water management advantages for the Project. As a result, Synapse has elected to continue evaluating both technologies to determine the configuration that provides the best overall balance of environmental performance, operational reliability, maintainability, constructability, and lifecycle cost.

Under the OTSG configuration currently being evaluated, each GTG would be paired with a dedicated OTSG, with steam generated by the individual units supplied to a common steam turbine generator. Both HRSG and OTSG designs incorporate a single visible exhaust stack. However, OTSG design may eliminate the need for an internal bypass-stack SCR system.

The OTSG configuration also presents significant potential benefits for water management. Unlike conventional HRSG systems, OTSG technology eliminates routine boiler blowdown requirements. Elimination of routine blowdown also removes the need for associated blowdown handling, storage, treatment, transport, and disposal infrastructure.

Accordingly, technologies that further reduce water consumption, wastewater generation, chemical consumption, and overall environmental footprint are being actively evaluated as part of the detailed engineering process to ensure the Project continues to align with BATEA principles and evolving industry best practices.

HRSG and OTSG technologies(“Steam Generation Equipment”) do not alter the Project's emissions control philosophy, emissions inventory, air quality modelling basis, or environmental performance commitments. Equipment suppliers being considered have confirmed that the applicable emissions guarantees will meet or exceed the emissions values used Project Air Quality Dispersion Modelling Assessment..

A set of drawings to accompany this process description can be found in Appendix D-1. Please note that the Process Flow Diagrams (PFDs) present nominal operating pressures and associated actual volumetric flow rates (m^3/h) at the stated line pressure and operating temperature. These volumetric flow rates are not standardized. Where the application provides fuel use rates for regulatory assessment, the rates are stated on a defined standard / reference basis and are reconciled to the PFD values by pressure/temperature conversion (as applicable). Pressures shown on PFDs are provided for design intent and operability context and are expected to vary within normal operating control bands.

5.1 Description of Process

Natural gas is supplied to the facility by upstream midstream producers and delivered to the site (LSD 04-33-1-W5M) via a dedicated 16-inch buried transmission pipeline. At the plant boundary, the pipeline transitions to an above-grade riser equipped with a 16-inch by 18-inch pig trap to allow for inline inspection (ILI), cleaning, and maintenance activities. All above-grade piping associated with the inlet gas system is protected against external corrosion through cathodic protection and appropriate coatings.

Upon entering the facility, the natural gas is conditioned prior to use as fuel. The gas first passes through a cyclone separator to remove residual entrained liquids that may remain following midstream processing. Separated liquids are routed to a closed drain system, where they are temporarily stored and subsequently removed by pump truck and returned to the midstream producer.

Fuel gas pressure is reduced through pressure control valves to an operating pressure of approximately 2,800 to 3,000 kPa. Downstream of pressure regulation, the gas flows through high-pressure coalescing filtration to meet cleanliness and dew-point requirements for gas turbine operation. Filter drains and sample points are routed to a closed liquid handling system. Conditioned gas downstream of filtration is designated as fuel gas and distributed via a 16-inch eccentrically reduced fuel gas header supplying ten identical modular power plant units across the data centre.

Downstream of separation and conditioning, and before entering each turbine building, fuel gas passes through a line heater adjacent to each power house building to provide temperature conditioning upstream of each set of gas turbines. Under normal operating conditions, the line heater is expected to remain in service to provide inlet combustion temperatures as specified by the gas turbine manufacturer. A regulated low-pressure slipstream of natural gas is supplied to the line heater for pilot and combustion purposes.

Each modular power plant consists of two natural-gas-fired gas turbine generators (GTGs). Combustion air is drawn through inlet air filtration systems with sound attenuation and evaporative cooling to condition the air prior to entry into the gas turbine compressor. Fuel gas and conditioned air are mixed within the combustor, producing high-temperature, high-pressure combustion gases that expand through the turbine section to drive the generator.

Exhaust gases from each GTG are routed through a dedicated exhaust train designed to accommodate the installation of a dedicated steam generation unit for each gas turbine. The Project is currently evaluating both Heat Recovery Steam Generator (HRSG) and Once-Through Steam Generator (OTSG) technologies for this service. Each GTG exhaust train will include Selective Catalytic Reduction (SCR) systems for NOx control prior to discharge to atmosphere through the associated exhaust stack. The current design does not include separate simple-cycle bypass stacks.

The GTG exhaust systems are designed to support phased integration of the selected steam generation technology. Under the current design basis, each gas turbine will be paired with a dedicated HRSG or OTSG, as applicable. Steam produced from the individual steam generation units will be routed to a common steam header supplying a single steam turbine generator. During Phase 1, the permanent exhaust train and high-temperature SCR system will be installed such that GTG exhaust gases continue to receive SCR treatment prior to stack discharge. During Phase 2, the gas turbine may be taken offline as required to facilitate installation of boiler pressure parts, steam piping, and final integration with the steam turbine system.

Each GTG commissioned during Phase 1 provides approximately 50 MW of gross electrical output at 13.8 kV alternating current. Each modular power plant therefore produces approximately 100 MW gross during Phase 1 operation.

During Phase 1, exhaust gas temperatures entering the SCR systems are elevated, on the order of 550 °C. High-temperature SCR catalyst systems are therefore specified and consist of zeolite-based honeycomb catalyst grids utilizing 19 % aqueous ammonia for NO_x reduction. Substances used and generated during normal and non-routine operation, including fuels, reagents, auxiliary fluids, and maintenance-related wastes, are summarized in Section 5.2.

5.1.1 Selective Catalytic Reduction (SCR) Reagent Supply System

NO_x control for each gas turbine generator is achieved using selective catalytic reduction (SCR) systems utilizing a 19% aqueous ammonia reagent. A centralized aqueous ammonia storage, pumping, and distribution system is provided to serve all ten modular power plants across the data centre campus.

Aqueous ammonia is delivered to the facility by licensed third-party suppliers and offloaded into a double-walled, above-ground storage tank equipped with leak detection and overfill protection. The centralized storage system supplies a common ammonia header, from which individual ammonia supply lines branch to each modular power plant.

Each modular power plant is equipped with a dedicated ammonia control skid that meters aqueous ammonia from the common header to the associated SCR system. Ammonia injection rates are automatically controlled based on gas turbine operating mode, fuel gas flow rate, and measured exhaust NO_x concentrations to ensure effective emissions reduction while minimizing ammonia slip.

Under normal operating conditions, ammonia consumption varies dynamically with gas turbine load and combustion characteristics. During reduced-load operation or periods when individual gas turbines are offline, ammonia flow to the affected SCR systems is automatically reduced or isolated. The centralized ammonia storage and distribution system allows flexible, load-following reagent delivery while minimizing the need for multiple independent storage facilities, while day-tanks located at each power plant ensure a continuous supply during periods of distribution header maintenance.

All ammonia handling systems are designed in accordance with applicable safety, environmental, and regulatory requirements, including secondary containment, isolation valves, and controlled drainage. No routine discharge of aqueous ammonia occurs during normal operation.

Any residual aqueous ammonia resulting from maintenance, system draining, or abnormal events is collected and managed as a controlled liquid waste and is not discharged to soil or surface water.

5.1.2 Combined-Cycle Steam System (Closed-Loop Design)

The Project incorporates a combined-cycle power generation system utilizing gas turbine generators and a steam turbine generator. The steam generation portion of the facility is currently undergoing final technology evaluation between a conventional Heat Recovery Steam Generator (HRSG) configuration and a Once-Through Steam Generator (OTSG) configuration. Both technologies are capable of supporting the Project's planned combined-cycle operating mode and are being evaluated against environmental, operational, constructability, reliability, and water management criteria. Final technology selection will occur during detailed engineering. Regardless of the technology selected, the steam generation system will be designed to achieve the generating capacity, thermal performance, emissions performance, and environmental objectives utilized within the Project's environmental assessments and dispersion modelling studies.

Phase 2 of the project includes installation of dedicated steam generation equipment on the exhaust of each GTG, a single steam turbine generator (STG) driven by steam produced from the dedicated steam generation units, and the associated auxiliary systems required for steam cycle operation. Each gas turbine will be paired with its own steam generation unit, with steam routed to a common steam header supplying one STG. The STG provides approximately 40 MW of additional gross electrical output, increasing the total gross capacity of each modular power plant to approximately 140 MW under combined-cycle operation.

Upon implementation of Phase 2, exhaust gas temperatures downstream of the steam generation equipment are reduced to approximately 130 °C during normal operation. The SCR systems will be selected and located to maintain effective NOx reduction across the applicable operating temperature range.

When a gas turbine is isolated for maintenance, it is isolated from the stream generation equipment at the exhaust inlet duct enabling the operation of duct burners to continue steam production as required . The remaining GTG and associated steam generation unit may continue to operate, subject to final steam-cycle operating limits and detailed engineering design. The common steam turbine generator may operate at reduced output during single-GTG operation, or at maximum output through the use of duct burners in lieu of the exhaust from the GTG which has been taken offline.When operating in single-gas-turbine mode (one 50 MW class turbine offline for maintenance), the duct burner in the adjacent steam generation system is designed to replace the approximate exhaust heat contribution of the adjacent offline GTG unit. Based on the project natural gas lower heating value, this corresponds to a supplemental firing rate of approximately 70 – 80 MW_{th}, equivalent to an estimated fuel gas consumption of 4,900 – 5,400 kg/h (approximately 6,500 – 7,100 Sm^3/h) per modular block during this operating mode (48% – 53% less gas consumption than the gas turbine). This supplemental firing condition represents a maintenance contingency scenario and is not part of the base full-load mass balance presented in Section 5.7.

The steam and water system is explicitly designed as a closed-loop cycle with no continuous liquid discharge. Steam generated by the dedicated HRSGs or OTSGs, is routed through a common steam piping header,expands through the steam turbine and is exhausted to air-cooled condensers (ACCs). The ACCs operate under vacuum conditions, with turbine exhaust pressures typically in the range of approximately 10 to 15 kPa(a), optimized for steam turbine efficiency. Vacuum conditions are maintained through a combination of extraction fans, ejectors, and condensate pumps. The ACCs condense exhaust steam without the use of circulating cooling water, eliminating evaporative losses associated with cooling towers or surface-water-based condenser systems.

Condensate collected from the ACCs drains to the condensate system and is returned to the boiler feedwater (BFW) circuit via condensate pumps. A gland steam condenser is provided to condense leakage steam from turbine seals. Condensate recovered from this system is routed back into the main condensate circuit downstream of the ACCs.

Condensate is filtered and monitored using online analyzers prior to storage in a condensate storage tank. Dissolved gas removal and feedwater chemistry control will be finalized based on the selected HRSG and OTSG technology and vendor-specific configuration. The selected approach will meet applicable boiler and turbine water chemistry requirements without prescribing a specific mechanical arrangement at this stage of design.

5.1.3 Cooling Water System – Closed-Loop Glycol Circuit

Auxiliary cooling services are provided by a closed-loop cooling water system utilizing a nominal 50 / 50 water–glycol mixture. This system supplies cooling to auxiliary equipment including, but not limited to, lube oil coolers, generator coolers, and gland steam condensers. The cooling water circuit operates entirely as a closed loop and does not rely on evaporative heat rejection or raw water makeup during normal operation. Minor fluid losses may occur due to maintenance activities, sampling, or component replacement. However, no routine discharge of glycol-containing fluids occurs during normal operation.

The auxiliary cooling system is sized to manage a total heat rejection load of approximately 2.8 MW_{th} per plant, which accounts for cooling requirements of the GTG / STG generators, lube oil systems, and feedwater pump auxiliaries.

The cooling water system includes an expansion and storage tank maintained at atmospheric pressure. The tank is equipped with a demister to prevent glycol vapor carryover while allowing pressure equalization. Continuous side-stream filtration is provided to remove particulates and accumulated impurities, maintaining long-term fluid quality and protecting system components. Although the process flow diagrams identify a deaerator within the cooling water circuit, operational experience may support bypassing or removal of this equipment in the final configuration.

Heat rejection from the cooling water system is achieved via air-cooled heat exchangers. No cooling ponds, cooling towers, or once-through cooling systems are utilized.

5.1.4 Water Management, Recovery, and Make-Up

The Project is designed to minimize water consumption and wastewater generation through the use of closed-loop steam, condensate, and cooling water systems. Depending upon the final steam generation technology selected, routine water losses may include equipment drains, gland steam sealing system evaporation, sample conditioning systems, maintenance activities, and, where applicable, limited boiler water management activities.

The Project is currently evaluating advanced water recovery and regeneration technologies in conjunction with the final steam generation technology selection. Technologies under evaluation include conventional water treatment systems and advanced electrolysis-based water conditioning systems intended to continuously maintain condensate and feedwater quality within the operating cycle. Preliminary engineering evaluations indicate that these technologies may substantially reduce or eliminate routine boiler blowdown requirements, significantly reduce wastewater generation, reduce chemical consumption, and further reduce make-up water demand.

In all iterations of the condensate recovery process design, all condensate is returned back into the steam cycle. Final treatment system configuration and recovery performance will be confirmed during detailed engineering following completion of the ongoing steam generation technology evaluation.

Make-up water will be supplied only as required to offset unrecoverable system losses and will be stored within the dedicated on-site boiler feed water storage tank. Make-up water is expected to be delivered by licensed third-party suppliers. No continuous raw water withdrawal is required for normal operation.

5.1.5 Relief, Venting, and Overpressure Protection Philosophy

The facility does not include a conventional flare stack. Overpressure protection is provided by ASME code-compliant mechanical pressure relief devices installed and sized in accordance with applicable requirements, including ASME Section I for boiler and stream generation pressure parts, ASME B31 piping codes for relief headers, and applicable National Board and ABSA regulations. Mechanical pressure relief devices serve as the primary means of overpressure protection. Activation of pressure relief devices is non-routine and limited to abnormal or emergency operating conditions.

Relief gas handling is coordinated through a dedicated Safety Instrumented System (SIS) designed to applicable Safety Integrity Level (SIL) requirements. The SIS does not replace or override mechanical pressure relief devices; rather, it provides supervisory control and routing logic to manage the disposition of relief gases following discharge from code-compliant relief devices.

Relief gases are routed through engineered, closed relief headers to designated duct burner systems rather than discharged directly into the atmosphere. This relief method ensures that relieved gases are routed to an engineered combustion system, where available, and that resulting combustion products are treated through the applicable SCR system, which increases reagent injection based on release rates through the PSV header system. The SIS continuously evaluates system configuration, operational status, and proximity of available combustion systems and enables routing of relief gases to an appropriate duct burner equipped with a certified Burner Management System (BMS). Selection of the duct burner is based on system availability, operating state, and proximity to the relief source at the time of the event.

The duct burners and associated BMS are designed to safely receive, combust, and dispose of relief gases under controlled conditions. Interlocks prevent routing of relief gases to any combustion system that is unavailable, offline, or not in a permissive state. In the unlikely event that no suitable combustion path is available, relief systems default to a safe condition consistent with applicable code and safety requirements (fail safe).

This approach eliminates the need for a flare stack while maintaining full compliance with ASME and ABSA requirements for overpressure protection and ensuring that relief events are managed in a controlled, monitored, and inherently safe manner consistent with the facility's closed-loop and low-emissions design philosophy.

5.1.6 ABSA Regulatory Justification – Relief Gas Disposition Without Flare

The absence of a conventional flare stack is consistent with ABSA regulatory intent provided that primary overpressure protection is achieved using ASME code-compliant mechanical pressure relief devices and that discharge piping and disposal systems are engineered to safely manage relieved fluids. In this design, all pressure vessels, boilers, HRSG/OTSG pressure parts, fuel gas systems, and associated piping are protected by certified mechanical pressure relief devices sized and installed in accordance with applicable ASME codes and National Board requirements.

Relief gas routing to controlled combustion systems does not replace or impair the function of these devices and is implemented only downstream of relief discharge. The use of supervised, enclosed relief gas disposal via duct burners equipped with certified Burner Management Systems (BMS), combined with a Safety Instrumented System (SIS) designed to applicable SIL requirements and integrated with the ammonia injection control system (SCR), provides a controlled, monitored, and inherently safer alternative to atmospheric venting or flaring. This approach aligns with ABSA's focus on code compliance, demonstrable safety, and engineered risk reduction, while avoiding unnecessary emissions and ignition hazards associated with open flare systems.

5.1.7 Overall Site Mass Balance Summary (100% Load Basis)

A mass balance was prepared for normal operation with two 50 MW gas turbines and one 40 MW steam turbine in service (Phase 2 configuration). Inputs consist of unbundled inlet air constituents, fuel gas (verified by HYSYS), and 19% aqueous ammonia reagent. The stack exhaust bulk mass flow accounts for all combustion products, including the inert Argon and Helium.

A) Process Inputs (kg/h)

The following table summarizes the mass entering a single 140 MW modular block, with air constituents separated based on standard atmospheric mass fractions

Input	Basis	kg/h
Nitrogen (N_2)	~75.47% of inlet air	783,831
Oxygen (O_2)	~23.20% of inlet air	240,955
Argon (Ar)	~1.28% of inlet air	13,294
Natural Gas	2x GT + pilot “duct burner”	21,587
SCR Reagent	19% aq. NH_3 solution	69.5
Water Vapour (H_2O)	Atmospheric humidity	520
Total Inputs		1,060,256.5

B) Stack Exhaust Outputs (kg/h)

The outputs are derived from combustion stoichiometry, HYSYS modeling, and the Air Quality Assessment.

Outputs	kg/h
Nitrogen (N_2)	800,103.7
Oxygen (O_2)	162,349.0
Argon (Ar)	13,294.0
Water (H_2O)	30,301.4
Carbon Dioxide (CO_2)	59,983.0
Carbon Monoxide (CO)	25.5
He (trace)	0.93
NO_x and NH_3 slip	10.7
Total Outputs	1,049,919.2

C) **Mass Balance Closure Assessment**

The difference reflects natural rounding variances between distinct data sources.

Item	kg/h
Total Inputs	1,060,256.5
Total Outputs	1,049,919.2
Difference (Out – In)	10,337.30
Percent Difference	0.97%

Note on Accuracy: The closure difference of < 1.0% is consistent with standard engineering tolerances. This variance arises from the rounding of atmospheric gas constants and the integration of data from three distinct sources: the HYSYS simulation (for CO_2 and H_2O), the Air Quality Assessment (for NO_x and NH_3 slip), and NGTL pipeline data (for fuel composition).

5.2 Process Substances Generated / Used in a Typical Day

This section describes substances used and generated during normal and non-routine operation of the facility. Substances are grouped as process inputs intentionally introduced to support power generation; atmospheric substances generated as a result of combustion and emissions control processes; and wastes generated during maintenance and non-routine activities. Quantitative emissions and environmental effects are addressed in the applicable technical assessments.

5.2.1 Process Substances Used

The following subsections describe substances intentionally introduced to support power generation and auxiliary system operation. These substances are consumed, circulated, or retained within engineered systems during normal operation and are managed to prevent uncontrolled release.

5.2.1.1. Natural Gas (Fuel)

Natural gas is the primary energy source for the facility, and is used as fuel for the gas turbine generators and, where applicable, duct burners associated with the combined-cycle configuration. Pipeline-quality natural gas is delivered directly to the site, conditioned to meet gas turbine operating requirements (filtered and heated), and combusted to produce thermal energy that is converted to electrical power.

Characterization: Pipeline-quality natural gas composed primarily of methane with minor quantities of higher hydrocarbons.

Fuel Gas Quantity Basis: Fuel gas consumption in this application is reported as Standardized Volumetric Flow, Sm^3/h at 101.325 kPa(a) and 15°C. For clarity, the PFD stream tables show actual volumetric flows (m^3/h) at nominal line pressures (e.g., turbine fuel gas supply at approximately 2,800 to 3,200 kPa). The PFD values are therefore pressure-specific and should not be directly compared to standard volumetric rates without conversion.

Quantity: (all plants combined)

- **Minimum:** 50% load (700 MW): 129,600 Sm^3/h with startups, shutdowns, and maintenance activities.
- **Normal:** 75% load (1,050 MW): 194,300 Sm^3/h, gas demand is proportional to gas turbine load and operating hours.
- **Maximum:** 100% load (1,400 MW): 259,100 Sm^3/h, which may occur due to minor variations during transient operation, peak loads, load transfers, or due to ambient weather conditions.

Source of Introduction: Supplied via the regional natural gas transmission and distribution system.

Waste Generated: None. Natural gas is consumed during combustion. Combustion by-products are addressed as atmospheric emissions in Section 5.2.2 and in the air quality assessment.

5.2.1.2. Aqueous Ammonia (19 % NH_3 Solution)

Aqueous ammonia is used as a chemical reagent to support nitrogen oxides (NO_x) control within the selective catalytic reduction (SCR) systems installed on gas turbine exhausts. The reagent is alkaline, stored and distributed in liquid form, and is injected in controlled quantities into the exhaust stream to facilitate catalytic reduction of NO_x emissions during operation. It reacts with NO_x to form nitrogen (N_2) and water (H_2O)

Characterization: Aqueous solution containing approximately 19% ammonia by weight

Quantity: Ammonia consumption varies with gas turbine load, SCR inlet NOx concentration, catalyst performance, and final SCR configuration. The emissions control systems will achieve the NOx and ammonia slip values used in the Project's air quality dispersion modelling assessment.

All SCR designs consider the following flow rates based on two modes of operation, on a per plant basis:

- **Mode 1:** 2 gas turbines = 69.5 kg/h
- **Mode 2:** 1 gas turbine with make-up duct burning = 53.3 kg/h

Source of Introduction: Delivered to site by licensed suppliers and distributed to SCR injection systems via controlled storage and pumping systems.

Waste Generated: Ammonia slip is limited by SCR design to a maximum of 5 ppmvd (dry), on a per-plant basis, consistent with the Project air quality dispersion modelling assessment.

All SCR designs guarantee the following slip rates based on two modes of operation, on a per plant basis:

- **Mode 1:** 2 gas turbines = 2.96 kg/h
- **Mode 2:** 1 gas turbine with make-up duct burning = 2.27 kg/h

5.2.1.3 Demineralized Water (Boiler Feedwater / Make-Up Water)

Demineralized water is used within the steam and water cycle to support steam generation and heat recovery during combined-cycle operation. Water quality is controlled to meet boiler and turbine chemistry requirements, and the system is designed to operate as a closed loop with minimal make-up demand.

Characterization: High-purity water treated to meet boiler and steam turbine chemistry requirements.

Quantity: (all plants combined)

- **Normal:** Approximately 10 m^3/day for the total site (based on 1.0 m^3/day per modular power plant), with a system design capacity for up to 20 m^3/day to accommodate non-routine maintenance.
- **Non-Routine:** Temporary increases during start-up or maintenance activities.

Source of Introduction: Produced on site from raw water supplies using water treatment systems.

Waste Generated: None during normal operation. Maintenance-related wastes are addressed in Section 5.2.3.

5.2.1.4 Water–Glycol Mixture (Auxiliary Cooling)

A water–glycol mixture is used as a heat transfer medium within auxiliary cooling systems serving balance-of-plant equipment. The mixture circulates in a closed loop to provide freeze protection and reliable heat removal without reliance on evaporative cooling or once-through water systems.

Characterization: Closed-loop mixture of water and glycol - either ethylene or propylene glycol blend.

Quantity: (all plants combined)

- **Normal**: Static inventory within closed-loop systems.
- **Non-Routine**: Minor losses possible during maintenance or component replacement.

Source of Introduction: Supplied by licensed vendors during initial fill and replenishment.

Waste Generated: None during normal operation. Spent fluids generated during maintenance are addressed in Section 5.2.3.

5.2.1.5 Lubricating Oil

Lubricating oil is used to support the safe and reliable operation of rotating equipment, including both gas and steam turbine generators, and associated auxiliaries. The oil provides bearing lubrication, cooling, and hydraulic control functions and is retained within dedicated lubrication systems during normal operation.

Characterization: Petroleum-based turbine lubricating oil (ISO VG 32 class).

Quantity: (all plants combined)

- **Normal:** Retained within closed lubrication systems with minor top-up.
- **Non-Routine:** Localized losses possible during maintenance or equipment failure.

Source of Introduction: Supplied by licensed lubricant suppliers.

Waste Generated: None during normal operation. Used oil and contaminated materials are addressed in Section .5.2.3.

5.2.1.6 Carbon Dioxide (Fire Suppression System)

Carbon dioxide is used as a fire suppression agent within enclosed gas turbine generator compartments and associated equipment spaces. The system is provided solely for emergency response and is not used during normal plant operation.

Characterization: Compressed carbon dioxide gas

Quantity: (all plants combined)

- **Normal:** No routine use.
- **Non-Routine:** Discharge during fire suppression events, or during fire suppression system testing, only.

Source of Introduction: Pre-charged fire suppression cylinders installed on site.

Waste Generated: None (released CO_2 disperses to atmosphere during discharge events).

5.2.1.7 pH Buffering (Alkalinity Builder)

CHEMAQUA 11800 is a concentrated liquid alkalinity builder used to control corrosion and deposits by maintaining optimal pH levels within the steam boiler system. An evaluation is currently underway with the manufacturers of the steam generation technologies under consideration, to determine if the CHEMAQUA 11800 can safely and effectively be substituted with readily available 19% aqueous ammonia to minimize chemical requirements. Should such a substitution be compatible within the boiler metallurgy and water circuit, the aqueous ammonia supply from each plants day-tank will be tied into the water management control system accordingly.

Characterization: A concentrated alkaline solution containing 30–60% Sodium Hydroxide.

Quantity: (per plant)

- **Normal**: Approximately 2.0 L/h to 5.0 L/h, distributed via independent chemical injection skids from 1 m^3 totes (T-CPH-100 to 110).
- **Non-Routine**: Localized use during system passivation or following major water chemistry excursions.

Source of Introduction: Stored in HDPE IBC totes within internal bermed containment cells at each power plant building.

Waste Generated: None during normal operation; chemical is consumed within the boiler water cycle.

5.2.1.8 Corrosion Inhibitor (Condensate Treatment)

CHEMAQUA 18101 is a morpholine-based neutralizing amine used to prevent corrosion in steam distribution and condensate return lines by neutralizing carbonic acid.

Characterization: An aqueous amine solution containing 15–40% Morpholine.

Quantity: (per plant)

- **Normal**: Approximately 0.5 L/h to 2.0 L/h continuous metered injection into the steam/condensate cycle from 1 m^3 totes (T-CCI-100 to 110).

Source of Introduction: Metered via dedicated injection skids directly into the process stream to maintain metallurgy protection.

Waste Generated: None; the substance is maintained within the closed-loop steam cycle.

5.2.1.9 Oxygen Scavenger

CHEMAQUA 10268 is a liquid diethylhydroxylamine (DEHA) based catalyzed oxygen scavenger and metal passivator used to minimize corrosion without adding dissolved solids to the boiler water.

Characterization: A volatile organic aqueous solution containing 15–40% N,N-Diethylhydroxylamine and 3–7% Hydroquinone.

Quantity: (per plant)

- **Normal**: Approximately 0.25.0 L/h to 1.0 L/h, fed directly to the storage section of the deaerator via stainless steel injection lines from 1 m^3 totes (T-CDO-100 to 110).

Source of Introduction: Introduced below the water level in the deaerator storage section to ensure maximum oxygen removal efficiency.

Waste Generated: None; volatile components carry over with steam to provide "after-boiler" section protection.

5.2.1.10 Scale Inhibitor

CHEMAQUA 13455 is an all-polymer internal treatment designed to control hardness and iron deposition. It includes an inert fluorescent tracer for real-time monitoring of product residuals.

Characterization: A non-hazardous aqueous solution containing synthetic polymers and fluorescein dye.

Quantity: (per plant)

- **Normal**: Approximately 0.1 L/h to 0.5 L/h, managed via the aquaDART® Boiler controller to maintain precise dispersant levels from 1 m^3 totes (T-CAS-100 to 110).

Source of Introduction: Metered into the boiler feedwater system to prevent scale formation on heat transfer surfaces.

Waste Generated: Trace amounts are removed through steam-cycle water management activities, where applicable, and will be captured and managed through the Project's water recovery and treatment systems. If OTSG technology is selected, routine boiler blowdown will be eliminated, and trace amounts will be removed through the reverse osmosis (RO) and electrodeionization (EDI) systems.

5.2.2 Substances Generated During Normal Operation

The following subsections describe substances generated as a result of combustion and emissions control processes during normal operation. Atmospheric constituents are conveyed with exhaust gases and discharged to the atmosphere, while internal working fluids remain within closed-loop systems. Detailed emissions characterization and compliance assessment are addressed in attached Air Quality Dispersion Modelling Assessment(June 12th).

5.2.2.1 Combustion Exhaust Gases

Combustion exhaust gases are generated during normal operation of the gas turbine generators as a result of natural gas combustion. These gases are conveyed through the heat recovery and emissions control systems prior to discharge to the atmosphere via exhaust stacks.

Source / Generation Mechanism: Combustion of natural gas within the gas turbine combustors.

Occurrence: Continuous during gas turbine operation.

Quantity: Based on the 140 MW modular block mass balance, the total stack exhaust bulk mass flow is 1,049,919.2 kg/h per plant.

Disposition: Conveyed through heat recovery and emissions control systems and discharged to the atmosphere via exhaust stacks.

Constituent Breakdown: The bulk exhaust gas consists of Nitrogen, Oxygen, Argon, Water Vapour, and Carbon Dioxide, along with trace emissions of NO_x, CO, and ammonia slip, as detailed in the following subsections.

Combustion exhaust gases include the products of fuel combustion and emissions control reactions. Nitrogen oxides are reduced through the SCR systems, producing nitrogen and water vapour. Trace quantities of ammonia slip, carbon monoxide, and unburned hydrocarbons may be present, particularly during start-up, shutdown, and transient operating conditions. These constituents are managed through combustion control, catalyst selection, and automated reagent dosing, as addressed in the air quality assessment. Combustion exhaust gases represent the primary continuous atmospheric emission from the facility and are addressed quantitatively in the air quality and emissions assessment, and further within the following subsections of this document.

5.2.2.2 Products of SCR Reactions (Nitrogen, N_2, and Water Vapour, H_2O)

Reaction products are formed within the selective catalytic reduction (SCR) systems as nitrogen oxides are converted to benign compounds. These products are carried with the exhaust gas stream and discharged to the atmosphere following emissions control.

Source / Generation Mechanism: Catalytic reduction of NO_x within SCR systems.

Occurrence: Continuous during SCR operation; proportional to NO_x reduction rate and gas turbine load.

Quantity: Based on the 140 MW modular block mass balance, Nitrogen (N_2) is released at 800,103 kg/h. Water vapour generated by SCR reactions and reagent carrier evaporation contributes approximately 78 kg/h to the total exhaust water mass flow of 30,301.4 kg/h.

Disposition: Conveyed with exhaust gases and discharged to atmosphere via the exhaust stacks.

Assessment Location: Air quality assessment.

5.2.2.3 Trace Ammonia (Slip)

Trace quantities of ammonia may be present in exhaust gases downstream of the SCR systems as a result of emissions control operation. Ammonia slip is minimized through system design, catalyst selection, and automated control of reagent injection rates.

Source / Generation Mechanism: Incomplete reaction of injected ammonia within SCR systems.

Occurrence: Intermittent – most likely during transient operating conditions, including start-up or loading, or due to catalyst aging.

Disposition: Conveyed with exhaust gases and discharged to the atmosphere, with concentrations minimized through SCR design and control. Slip is limited by SCR design with a maximum of 5 ppmvd (dry), on a per-plant basis.

- **Mode 1:** 2 gas turbines = 2.96 kg/h
- **Mode 2:** 1 gas turbine with make-up duct burning = 2.27 kg/h

5.2.2.5 Carbon Monoxide (CO) and Trace Compounds

Trace quantities of carbon monoxide and other compounds are generated during combustion, particularly during start-up, shutdown, and transient operating conditions. These constituents are conveyed with exhaust gases and are managed through combustion control and operating practices.

Source / Generation Mechanism: Incomplete oxidation during combustion, particularly during start-up, shutdown, and transient operation.

Occurrence: Intermittent.

Quantity: Based on the 140 MW modular block mass balance, the CO emission rate is 25.5 kg/h per plant, the Argon emission rate is 13,294.0 kg/h, and Helium is 0.93 kg/h per plant.

Disposition: Conveyed with exhaust gases and discharged to atmosphere and managed through combustion controls.

5.2.2.6 High-Pressure Steam (Waste Heat Recovery Product)

High-pressure steam is generated within the dedicated steam generation equipment associated with each gas turbine through recovery of thermal energy from gas turbine exhaust gases. The Project is currently evaluating both Heat Recovery Steam Generator (HRSG) and Once-Through Steam Generator (OTSG) technologies for this service.

The steam serves as an intermediate working fluid within the combined-cycle configuration and is expanded through a steam turbine generator to increase overall plant efficiency. The steam cycle is designed to allow controlled extraction of steam for auxiliary process requirements. In future project phases, a portion of available steam may be utilized to support planned carbon capture and compression systems, subject to separate design and regulatory approvals.

Source / Generation Mechanism: Thermal energy recovered from gas turbine exhaust gases within dedicated steam generation equipment, producing high-pressure steam under combined-cycle operation.

Operating Conditions: Preliminary design conditions indicate high-pressure steam conditions on the order of approximately 6,300 kPa and 495 °C, subject to final vendor design confirmation.

Quantity: The steam generation system of each plant is configured to manage the production of 140,000 kg/h of high pressure steam production for entry into the steam turbine generator (STG).

Occurrence: Continuous during combined-cycle operation (Phase 2 and subsequent phases). No steam is generated during simple-cycle (Phase 1) operation.

Disposition: Steam is routed directly to the steam turbine generator, expanded to produce electrical power, and subsequently condensed within the closed-loop steam cycle. No routine discharge of steam to the atmosphere occurs during normal operation.

Assessment Location: Steam cycle performance and energy recovery are addressed within plant design documentation and mass/energy balance assessments. Steam does not constitute an atmospheric emission or waste stream.

5.2.2.7 Carbon Dioxide (CO_2)

Carbon dioxide is generated as a natural by-product of natural gas combustion during power generation, discharged to the atmosphere as part of the exhaust gas stream. Carbon dioxide (CO_2) is generated as a non-hazardous combustion by-product of natural gas firing and is released via controlled stack discharge. CO_2 is regulated as a greenhouse gas under applicable provincial legislation.

Based on combined exhaust gas modelling, the maximum CO_2 emission rate is 59,983 kg/h per 140 MW modular block (10 blocks total), equivalent to 599,830 kg/h for the campus at full output.

Source / Generation Mechanism: Oxidation of carbon-based fuel during combustion.

Occurrence: Continuous during gas turbine or after-burner / duct-burner operation.

Quantity: (all plants combined)

On a screening-level basis, CO_2 mass emissions scale with plant load as follows:

- **Minimum (50% load – 700 MW):** 299.92 tonnes CO_2/h (approx. 2.399 million t/y @ 8,000 h/y)
- **Normal (75% load – 1050 MW):** 449.87 tonnes CO_2/h (approx. 3.599 million t/y @ 8,000 h/y).
- **Maximum (100% load – 1,400 MW):** 599.83 tonnes CO_2/h (approx. 4.798 million t/y @ 8,000 h/y)

Disposition: Discharged to atmosphere with exhaust gases.

Assessment Location: Addressed within plant design documentation and mass/energy balance assessments.

5.2.2.8 Exhaust Water Vapour

Water vapour is generated as a primary product of natural gas combustion and is discharged to the atmosphere as a constituent of the exhaust gas stream.

Source / Generation Mechanism: Chemical reaction of fuel-bound hydrogen with combustion air.

Occurrence: Continuous during gas turbine or duct-burner operation.

Quantity: Based on the stoichiometric combustion of 21,587 kg/h of natural gas, the nominal water vapour emission rate is 30,301 kg/h per plant.

Disposition: Conveyed with the exhaust gases and discharged to the atmosphere via the exhaust stacks.

5.2.2.9 Nitrogen Oxides (NO_x)

Nitrogen oxides are reduced through the SCR systems, producing nitrogen and water vapour. Residual NO_x is discharged via the stack.

Source / Generation Mechanism: Thermal and prompt NO_x formation during high-temperature combustion.

Quantity: Based on the Air Quality Dispersion Modelling Assessment(June 12th) and a mass emission of 2.35 g/s, the NO_x emission rate is 8.46 kg/h per plant.

Disposition: Discharged to atmosphere via the exhaust stacks following reduction in the SCR

5.2.3 Waste Streams Generated

This section describes waste streams generated as a result of routine maintenance, inspection, and non-routine operational activities associated with the facility. Wastes are not produced during normal steady-state power generation but may arise periodically from equipment servicing, system cleaning, and replacement of consumables. Waste handling and disposal are conducted in accordance with applicable regulatory requirements using licensed third-party contractors.

The quantities and composition of certain steam-cycle-related waste streams remain subject to final steam generation technology selection. The Project is currently evaluating technologies that may substantially reduce or altogether eliminate routine boiler blowdown and commonly associated wastes. Consequently, waste streams associated with steam-cycle operation should be considered preliminary and conservative for purposes of this application. Final waste stream quantities will be confirmed during detailed engineering.

5.2.3.1 Separated Hydrocarbon Liquids

Small quantities of hydrocarbon liquids, such as natural gas liquids (NGLs) and water (H_2O, may be separated from and accumulate within the inlet fuel gas conditioning systems (such as the cyclone separator vessel). The volumes are based on process upsets from suppliers, though during normal operation will be approximately 0.0 kg/day.

Source: Fuel gas conditioning and separation equipment.

Quantity

- Normal: Traceable amounts.

- Non-Routine: Increased during upstream gas supply changes, unplanned events, and planned maintenance operations.

Disposition: Collected and removed from site by licensed contractors, for return to midstream producers.

Waste Classification: Regulated liquid hydrocarbon waste.

5.2.3.2 Spent Glycol and Auxiliary Maintenance Fluids

Spent glycol and auxiliary fluids may be generated during maintenance of closed-loop cooling systems.

Source: Auxiliary cooling and maintenance activities.

Quantity

- **Normal:** None.
- **Non-Routine:** Generated during system draining or component replacement.

Disposition: Collected and removed from site by a licensed waste contractor

Waste Classification: Regulated waste, as applicable

5.2.3.3 Spent SCR Catalyst (End-of-Life)

Spent catalyst material is generated periodically when SCR catalyst elements reach the end of their service life and are replaced as part of scheduled maintenance activities. Catalyst replacement occurs infrequently and does not represent a continuous waste stream.

Source: SCR catalyst replacement activities.

Quantity:

- **Normal:** None.
- **Non-Routine:** Generated during catalyst replacement.

Disposition: Returned to supplier or removed by a licensed contractor.

Waste Classification: Regulated solid waste, designated based on metals content (i.e. zeolite or vanadium)

5.2.3.4 Used Lubricating Oil

Lubricating oil is not consumed as part of the power generation process and is not discharged during normal operation. Used lubricating oil is generated intermittently during scheduled maintenance and servicing of rotating equipment lubrication systems. Lubricating oil is retained within closed systems during normal operation and is replaced only as required to maintain equipment performance and reliability.

Source: Used lubricating oil generated from lubricating oil systems during scheduled maintenance (oil changes, system flushing) and non-routine maintenance activities.

Quantity

- **Normal:** None. Oil remains in service with minor periodic top-up.
- **Non-routine**: Used oil generated intermittently during servicing intervals.

Disposition: Collected in dedicated containers or tanks and removed from site by licensed contractors for recycling or disposal, as applicable.

Waste Classification: Used oil / regulated waste**,** preferentially directed to an approved recycling pathway (e.g., registered used oil materials processor) where applicable.

5.2.3.5 Oil-Contaminated Solids

Oil-contaminated solid materials are generated during routine maintenance, inspection, and spill response activities associated with lubrication systems and mechanical equipment. These materials include consumables that are replaced periodically to support safe and reliable operation.

Source: Coalescer/filtration elements, absorbent materials, rags, and PPE generated during routine maintenance and spill response activities.

Quantity

- **Normal:** Minor quantities, intermittently during scheduled maintenance.
- **Non-routine:** Increased quantities possible during major maintenance or unplanned interventions.

Disposition: Collected in sealed, leakproof containers; oil filters are drained and managed to prevent free liquids prior to shipment; materials are removed by licensed contractors.

Waste Classification: Oil filters and related “used oil materials” are directed to approved recycling pathways where applicable. Undrained filters may be characterized and managed as hazardous waste in accordance with Alberta guidance.

5.2.3.6 Aqueous Ammonia Residues (Non-Routine)

Small quantities of aqueous ammonia residues may be generated during non-routine activities such as maintenance, system flushing, or equipment isolation associated with the SCR reagent supply system. No routine discharge of ammonia occurs during normal plant operation.

Source: SCR system draining and servicing.

Quantity

- **Normal:** None.
- **Non-Routine:** Minor quantities during maintenance.

Disposition: Collected and managed as a controlled liquid waste and removed from site by licensed contractors.

Waste Classification: Managed as regulated waste in accordance with applicable requirements.

5.2.3.7 General Maintenance and Housekeeping Wastes

General solid wastes may be generated during maintenance and housekeeping activities, including packaging materials, disposable personal protective equipment, and non-contaminated refuse. These wastes are segregated and managed through standard waste collection and disposal practices.

Source: Maintenance and operational activities.

Quantity

- **Normal:** Minor quantities.
- **Non-Routine:** Increased quantities during outages.

Disposition: Collected and disposed of through approved waste management services.

Waste Classification: Non-hazardous solid waste.

5.2.3.8 Carbon Dioxide (CO_2)

Carbon dioxide is generated as a natural by-product of natural gas combustion during power generation. Carbon dioxide is discharged to the atmosphere as part of the exhaust gas stream and is addressed in the air quality and greenhouse gas assessment. Carbon dioxide emissions are addressed in the greenhouse gas assessments.

Source / Generation Mechanism: Oxidation of carbon-based fuel during combustion.

Occurrence: Continuous during gas turbine or after-burner / duct-burner operation.

Quantity: (all plants combined)

- **Minimum:** 50% load: 281.7 t CO_2/h (approx. 2.253 million t/y @ 8,000 h/y)
- **Normal:** operation held at 75% load: 422.5 t CO_2/h (approx. 3.380 million t/y @ 8,000 h/y).
- **Maximum:** 100% load: 563.4 t CO_2/h (approx. 4.507 million t/y @ 8,000 h/y)

Disposition: Discharged to atmosphere with exhaust gases.

Assessment Location: Detailed dispersion modelling was completed for NO_2, SO_2, and $PM_{2.5}$ in accordance with the Alberta AQMG. Other combustion by-products including CO and trace organics are managed through combustion controls and will be addressed through emissions inventory reporting..

5.2.3.9 Other Waste

Table 5.2.3.9.1 lists other waste types expected from the Project and their method of disposal.

Waste Stream	Management Method
Domestic waste	Contracted waste disposal
Recyclables (wood, paper, metal)	Contracted recycling
Hazardous waste[1]	Licensed disposal facility
Waste oil[2]	Licensed recycler

Table 5.2.3.9.1 - Other Waste Summary

NOTES:

[1]Hazardous wastes include paint, solvents, batteries, fluorescent light bulbs, herbicides, etc. for use during construction and operation. Hazardous materials will be stored in secure cabinets. Wastes will be stored in a bin located adjacent to the multi-purpose building for disposal at a licensed facility. All hazardous waste will be stored in accordance with Hazardous Waste Storage Guidelines.

[2]Waste oil from equipment is not captured and stored. Equipment containing oil will be located on a concrete pad with secondary containment and closed drain valves. In the event of a leak, the oil will be removed/cleaned up by a vacuum truck and hauled offsite to a licensed disposal facility.

A small stand-alone enclosure will be provided for hazardous waste storage, the enclosure will:

- provide protection from access by unauthorized persons
- be posted as a hazardous waste/recyclables storage area
- have dedicated people responsible for the site and be able to respond to emergency situations
- be located away from sewer drains, manholes, drainage ditches and standing water
- provide for protection from the weather
- have adequate ventilation
- store wastes in double walled containers in good condition
- have secondary containment for liquids

5.3 Alternative Options Examined

This section summarizes the primary configuration alternatives previously evaluated for the Project to optimize overall efficiency and minimize environmental releases and waste generation. Alternatives were evaluated against efficiency / heat rate, number of emission release points, land footprint, constructability, operational availability (including maintenance while online), and balance-of-plant complexity (including water / steam cycle and chemical handling). The selected configuration is consistent with the Project's thermal performance basis and cooling philosophy described in the supporting application materials (heat rate and efficiency basis; dry cooling / closed-loop approach).

5.3.1 Alternatives Evaluated

Alternatives were evaluated to optimize overall efficiency and minimize emissions and waste generation while maintaining the required power availability for the data centre campus. The following technically feasible configurations were considered for each 140 MW modular power block:

Alt A – Two independent 1:1 combined-cycle trains (2 × [1 GTG : 1 HRSG/OTSG : 1 STG])
Two smaller steam cycles, each paired to one GTG, providing high redundancy at the steam cycle level but increased equipment count and complexity.

Alt B – 2:1 combined cycle with two HRSGs and one steam turbine (2 GTG : 2 HRSG : 1 STG)
Two GTG exhaust paths feed separate HRSGs tied to a common steam turbine and condenser system (single steam cycle).

Alt C (Selected) – Integrated 2:1 combined-cycle block with a single steam cycle and optimized exhaust path integration
Two GTGs exhausting to an integrated combined-cycle configuration utilizing a single steam cycle HRSG and one STG, with a minimized number of exhaust release points (stacks), and provisions for supplemental firing as required for operational flexibility.

Alt D – Simple cycle (GTG only)
GTGs exhausting directly to stack with emissions control. This configuration was evaluated as a permanent solution but is only planned as a temporary Phase 1 operating mode prior to combined-cycle completion.

Note: Alt D remains part of the phased execution plan (Phase 1), but it is not the selected end-state due to efficiency and emissions intensity.

Alt E - Integrated 2:2 OTSG based combined-cycle block with a single steam turbine and condenser system (split steam cycle)

Two GTGs exhausting into independent OTSGs, capable of dry-firing for a single high-temp SCR in service during all modes of operation, with a single combined exhaust stack tip. Provisions for supplemental duct firing enabled.

5.3.2 Selection Criteria

Alternatives were screened and ranked against the following criteria, with emphasis on minimizing releases and waste while maintaining reliability and availability:

1. **Thermal efficiency / fuel use** (heat rate; natural gas consumption per MWh).
2. **Air emissions intensity** (CO_2 per MWh; NO_x / CO compliance envelope; number of discharge points).
3. **Water use and waste minimization** (closed-loop losses; blowdown; chemical consumption; wastewater handling).
4. **Footprint / land disturbance** (site area, civil works, stormwater interface).
5. **Reliability / maintainability** (ability to isolate equipment while maintaining critical load; outage coordination).
6. **O&M complexity** (equipment count; inspection burden; spares; staffing requirements).
7. **CAPEX and constructability** (equipment count, schedule risk, modular replication).

5.3.3 Mass/Energy Balance Support (screening-level)

Screening-level mass and energy balance comparisons were performed using the project design basis efficiency assumptions.

For comparison purposes:

- Simple-cycle GT operation efficiency: approx. 36–38% (LHV basis)
- Combined-cycle configuration efficiency: approx. 48.1% (LHV basis)

For a fixed 140 MW electrical output per modular block, the fuel consumption impact was considered. At the Project design electrical efficiency of 48.1%, the total fuel energy input is approximately 291 MW_{th} per modular block. Of this input, 140 MW is converted to electrical power, approximately 97.6 MW_{th} is rejected via the closed-loop cooling systems (ACCs and auxiliary radiators), and the balance (approximately 53.4 MW_{th}) constitutes stack thermal loss. At 37% simple-cycle efficiency, fuel energy input is approximately 378 MW_{th}. At 48.1% combined-cycle efficiency, the configuration requires approximately 23% less fuel than a 37% simple-cycle plant producing equivalent power. Because CO_2 generation is directly proportional to fuel consumption, CO_2 emissions intensity is reduced by approximately 25 – 30% in combined-cycle operation versus simple-cycle.

For a fixed electrical output, the reduction in required fuel input under combined-cycle operation directly reduces total CO_2 mass emissions, total exhaust mass flow, and total criteria air contaminant loading relative to simple-cycle-only operation. Lower exhaust mass flow also reduces required SCR reagent consumption and total stack volumetric discharge.

Accordingly, combined-cycle operation reduces exhaust mass flow, stack volumetric discharge, SCR reagent demand, and total rejected waste heat per unit of electricity generated relative to simple-cycle-only operation.

5.3.4 – Summary Comparison Table

Alternative	GTGs	BLRs	STGs	Stacks / Discharge Points	Estimated Area (acres)	Min. Power Output during Maintenance	Relative Stack Gas Vol. / MWh	Relative Fuel / CO_2 Intensity
Alt A	2	2	2	4	2.5 – Highest	70 MW - Moderate	Low	Low
Alt B	2	2	1	2	2.5 – Highest	65 MW - Moderate	Moderate	Low
Alt C	2	1	1	1	1.9 – Moderate	90 MW – Highest	Lowest	Lowest
Alt D	2	0	0	2	1.0 - Lowest	50 MW – Lowest	Highest	Highest
Alt E	2	2	1	1	1.9	90MW-Highest	Lowest	Lowest

5.3.5 Rationale for Selected Alternatives

Alt E and Alt C are under final evaluation because they provide the best balance of efficiency, minimized release points, minimized footprint, and maintainability for a high-availability data-centre power supply.

- **Significant Emissions Intensity Reduction:** By integrating a 40 MW steam cycle with two 50 MW gas turbines, the modular block produces 140 MW of power from the same fuel gas input required for 100 MW simple-cycle operation. This represents an approximate 23.1% reduction in CO_2 intensity (from 562 kg/MWh to 428 kg/MWh).

- **Fewer air release points:** Integrating the exhaust from each combined cycle unit into a single exhaust stack reduces the number of major downstream emission-control trains and associated monitoring / release points versus configurations including bypass stacks. Reducing the number of emission discharge points simplifies dispersion modeling and long-term environmental compliance obligations relative to multi-train configurations.
- **Reduced footprint and construction complexity:** One HRSG gas path and one STG reduces equipment count, foundations, duct runs, and the number of separate steam-cycle systems compared with Alt A and Alt B.
- **Maintainability / uptime:** The design includes a duct-burner heat replacement strategy to maintain steam-cycle contribution when one GT is unavailable. The design incorporates supplemental firing capability sized to replace approximately 70 – 80 MW of GT exhaust thermal contribution during maintenance events, thereby maintaining steam-cycle generation while avoiding the need for additional steam-cycle trains.
- **Waste minimization (steam cycle auxiliaries):** Fewer steam-path trains reduces the number of blowdown / sample points and simplifies chemical handling and waste streams compared to multi-train HRSG / STG configurations.

Alt A, B and D

Alt A and Alt B were not selected primarily due to increased equipment count (HRSGs and / or STGs), increased construction / O&M complexity, and increased overall footprint and interfaces, which are undesirable for a modular campus requiring high availability and consistent operational control. Selection of Alternatives A or B, with increased HRSG quantity, would proportionally increase auxiliary cooling surface area, steam-cycle auxiliaries, and associated evaporative and blowdown losses relative to the single steam-train configuration.

Alt D was not selected as the final configuration because simple-cycle-only operation has the highest fuel consumption and CO_2 intensity per MWh. This mode of operation is retained as an interim Phase 1 operating mode prior to Phase 2 combined-cycle integration.

Alt C and E

On a screening-level mass and energy basis, Alternative C and E results in the lowest greenhouse gas intensity, lowest exhaust mass flow per MWh, minimized discharge points, and minimized auxiliary waste streams, and was therefore selected for detailed engineering and environmental assessment. Both configurations under evaluation achieve the emissions performance utilized within the Project Air Quality Dispersion Modelling Assessment..

Final technology selection will occur following completion of detailed engineering, commercial evaluation, and overall assessment of environmental, operational, and lifecycle performance objectives.

Alt E

Alt E, represents a combined-cycle configuration utilizing Once-Through Steam Generator (OTSG) technology. While the Project's preliminary engineering activities have primarily been developed around a conventional HRSG-based combined-cycle configuration, commercially available OTSG technology is also being evaluated as part of the ongoing detailed engineering process due to its potential environmental, operational, constructability, and water management benefits.

Alt E utilizes two dedicated OTSGs, one associated with each GTG, supplying steam to a common steam turbine generator. Preliminary engineering evaluations indicate that this arrangement may allow utilization of a single high-temperature SCR system while eliminating the need for separate bypass-stack SCR systems (not publicly visible). This approach has the potential to reduce equipment count, simplify ammonia distribution infrastructure, reduce project footprint, reduce capital cost, improve maintainability, and reduce the overall visual impact of the facility through a reduction in the number of major exhaust structures.

The OTSG configuration also presents significant potential water management benefits. Unlike conventional HRSG systems, OTSG technology may eliminate routine boiler blowdown requirements, thereby reducing or eliminating a primary source of process wastewater generation. Elimination of routine blowdown also removes the need for associated blowdown handling, storage, treatment, transport, and disposal infrastructure. Preliminary engineering evaluations indicate that this approach may substantially reduce boiler water treatment chemical requirements, reduce overall water treatment complexity, simplify condensate recovery systems, reduce make-up water demand, and potentially eliminate the need for complex Zero Liquid Discharge (ZLD) systems.

5.4 Land Footprint Minimization

The Project has been intentionally designed to minimize overall land disturbance, permanent site footprint, and incremental environmental impact through infrastructure consolidation, vertical integration of equipment, and shared services across modular power blocks.

Land footprint minimization was incorporated as a primary design objective during configuration selection (see Section 5.3) and is reflected in several design elements. On a site-wide basis, the selected configuration represents a deliberate consolidation strategy that minimizes total disturbed land area per installed megawatt relative to conventional multi-train combined-cycle facilities, while maintaining operational reliability and compliance with provincial emission requirements.

5.4.1 Consolidated Combined-Cycle Configuration

Selection of the integrated 2:1 combined-cycle configuration (two GTGs exhausting to two HRSG / OTSGs and one STG per modular block) with a single exhaust stack, materially reduces equipment count relative to multi-train alternatives.

Compared to configurations utilizing two STGs per block, the selected configuration:

- Eliminates one full STG footprint per block
- Eliminates associated piping, duct runs and structural steel
- Reduces foundations and support piers
- Reduces auxiliary steam-cycle equipment and access platforms

This consolidation reduces the required footprint by approximately 50 ft × 25 ft per modular power block relative to a dual-STG configuration. This equates to approximately 1,250 ft² per modular block.

Reducing the quantity of exhaust stacks also reduces long-term maintenance access corridors and auxiliary equipment pads, further minimizing graded surface area. Reduced equipment count also reduces required grading, foundation excavation, and impervious surface area, thereby reducing stormwater runoff interface and long-term erosion management requirements.

5.4.2 Vertical Integration of Cooling Systems

The Project cooling systems have been arranged to minimize overall site disturbance while accommodating equipment height constraints, acoustic requirements, operational considerations, and municipal development restrictions. To minimize stack height the Air Cooled Condensers(ACCs) have been placed on grade adjacent to the power plant.

Closed-loop 50/50 glycol dry cooling systems remain integrated on the power plant roof adjacent to the gas turbine combustion air intake systems. The glycol surge tanks have also been located on the roof level, reducing building volume requirements and minimizing the overall building footprint.

This arrangement represents a balanced integration strategy in which large steam-cycle cooling equipment is located at grade while auxiliary cooling systems are vertically integrated within the power plant structure. The resulting configuration reduces building size, limits structural steel requirements, minimizes overall site disturbance, and avoids the extensive ground-level cooling infrastructure commonly associated with conventional power generation facilities.

5.4.3 Closed-Loop Cooling Philosophy

The Project employs a closed-loop cooling design rather than conventional evaporative cooling towers.

This design choice:

- Avoids large cooling tower basins
- Eliminates large evaporative plume drift zones
- Reduces blowdown discharge volumes
- Reduces make-up water storage requirements
- Avoids continuous high-volume water withdrawal infrastructure

By avoiding evaporative cooling towers and large water basins, the Project significantly reduces the horizontal footprint and eliminates the need for large cooling water distribution corridors across the site. This approach also minimizes long-term environmental interface areas associated with water management systems.

5.4.4 Shared Site Infrastructure

The ten modular power blocks share centralized infrastructure wherever practical, including:

- Common demineralized water storage
- Shared trucked-in water supply logistics
- Shared cooling pond / stormwater management infrastructure
- Shared site access and service corridors
- Consolidated emissions control philosophy per modular block

Centralizing water storage and management infrastructure avoids duplication of tanks, containment berms, and truck unloading areas at each block, reducing total disturbed area.

5.4.5 Minimization of Emissions Release Points

Integration of two GT exhaust streams into a single exhaust stack per modular block reduces the number of major stacks and emission-control trains relative to multi-train alternatives.

Fewer stacks:

- Reduce structural foundations
- Reduce vertical steel structures
- Reduce required access and inspection clearances
- Reduce underground utility routing

This contributes directly to reduced permanent disturbance area and simplified long-term site management.

5.4.6 Use of Existing Town Infrastructure

Installation near the town of Olds allows for:

- Connection to and use of town's existing water quota
- Connection to and use of town's domestic sewage treatment

5.5 Site Diagram

The site plan drawing in Appendix D-1 is provided to scale and identifies the location of pollution prevention and control infrastructure, including chemical storage containment systems (bermed where applicable, or curbed concrete containment for double-walled tanks), truck offloading containment areas, stormwater retention areas, and emission control equipment. Containment zones and unloading berms are visually delineated on the drawing.

The drawing identifies the location of major power plant components, storage areas, and environmental control infrastructure for each modular 140 MW power block and associated data center facilities.

The site layout integrates pollution prevention at the source by:

- Consolidating hazardous materials within engineered secondary containment systems (bermed or curbed depending on service)
- Locating unloading operations within dedicated contained zones
- Separating process water systems from stormwater management infrastructure
- Eliminating evaporative cooling towers and large open basins
- Reducing stack count and emission infrastructure through integrated HRSG configuration
- Utilizing closed-loop cooling and steam systems to minimize wastewater generation

The site configuration minimizes potential pathways for soil, groundwater, and surface water contamination and reduces the spatial footprint of regulated infrastructure relative to conventional power plant designs.

5.5.1 Buildings and Processing Equipment

Each 140 MW natural gas power plant block includes:

- Gas turbine generators (GTGs)
- Heat Recovery Steam Generators (HRSG) or OTSG
- Steam Turbine Generator (STG)
- SCR systems
- Electrical switchgear and MCC
- Water treatment and pumping systems
- Cooling glycol storage
- Condenser systems

Major process equipment is consolidated within defined equipment pads to minimize dispersed industrial activity across the site.

5.5.2 Hazardous Materials Storage and Containment

The primary hazardous materials on site include:

- 19% aqueous ammonia (bulk storage and day tanks)
- Boiler feedwater treatment chemicals
- Cooling glycol (50% by volume)
- Limited quantities of lubricating oils and maintenance fluids

The Treated Water Storage (TWS) tank contains demineralized and deoxygenated water for boiler feedwater supply and is not classified as a hazardous chemical storage system. The TWS tank is installed on a concreted curbed containment pad for operational containment and leak management.

Turbine lube oil systems are equipped with curbed containment and sumps to prevent release to surrounding soil in the event of leak or equipment failure.

As shown on the site plan:

- Bulk aqueous ammonia storage tanks are double-walled above-ground tanks installed on concreted curbed containment pads with interstitial leak monitoring.
- Ammonia day tanks adjacent to each SCR system are double-walled and installed on concreted curbed containment pads with interstitial monitoring.
- Cooling glycol storage tanks and associated pumps and filtration systems are installed within bermed containment systems.
- Boiler feedwater chemical injection systems are located adjacent to the steam cycle equipment within defined contained process areas.
- Truck offloading is completed over a berm-grated pit area.

Truck offloading of aqueous ammonia and Treaded Water is performed within an engineered grated containment berm (approximately 80 ft × 40 ft). The containment area is lined and graded to a controlled sump to prevent infiltration to soil. The containment capacity is designed to accommodate the full volume of a typical industrial tanker truck. Any collected liquids will be removed by licensed industrial vacuum services

All bulk chemical storage tanks will be installed within engineered secondary containment systems designed to capture at least 110% of the largest tank volume or 100% of the largest tank plus precipitation allowance, in accordance with applicable provincial requirements. Containment areas are designed with impermeable liners and controlled drainage to prevent infiltration to soil.

Transfer connections for aqueous ammonia and other chemicals will be located within contained unloading areas equipped with spill control measures and isolation capability. Loading and unloading activities will occur within bermed zones to prevent off-site migration in the event of accidental release.

5.5.3 Waste Areas and Maintenance Laydown

- Each modular block includes an area of approximately 11,271 sq ft (221 ft x 51 ft) for maintenance laydown, parts and tool storage, and mobile equipment operation.

These areas are located on defined hardstand surfaces to prevent soil contamination. Waste materials generated during maintenance activities are temporarily stored in designated containment areas prior to removal by licensed waste management contractors.

No long-term hazardous waste accumulation areas are planned outside of designated contained storage zones.

5.5.4 Wastewater and Runoff Controls

Stormwater and surface runoff are managed through:

- Controlled grading toward defined collection zones
- A shared stormwater retention pond
- Surface water management areas shown on the site plan

The stormwater retention pond is a lined basin designed to collect and attenuate site runoff prior to controlled discharge. No process water, cooling water, or chemical-contaminated streams are directed to the stormwater pond.

Closed-loop cooling and steam systems minimize process wastewater generation. Boiler blowdown and sampling discharges are limited and directed to controlled collection systems in accordance with applicable requirements.

Impervious surface area is minimized through equipment consolidation and rooftop cooling integration (see Section 5.4).

5.5.5 Air Emission Control Infrastructure

Each modular power block includes:

- SCR system located downstream of HRSG/OTSG
- Ammonia injection system
- Stack discharge point

Stack locations are shown on the site plan. Integration of two GT exhaust streams into a single HRSG/OTSG per block reduces total stack count and associated foundations.

5.5.6 Security and Access Control

The site includes:

- Controlled entrance points (Main Entrance, secondary security gates)
- Defined access corridors
- Centralized mechanical yards

Access control and video surveillance limits unauthorized entry to chemical storage and process areas, reducing risk of accidental release or tampering.

5.5.7 Diesel Storage

The Project will utilize double-wall generator belly tanks equipped with a continuous vacuum-sealed leak detection system. This self-contained fuel storage solution features an inner tank for primary containment and a secondary outer wall designed to provide 100% secondary containment of the primary fuel storage volume... The system maintains negative pressure within the interstitial space; any breach in the inner or outer wall causes a rise in pressure that triggers both audible and visual alarms, allowing for immediate intervention before a liquid breach occurs.

5.6 Materials Storage, Transfer, & Waste Management Control Systems

This section describes the design and specification basis for control systems and engineered safeguards associated with materials storage, chemical handling, transfer, and waste management areas. Controls are intended to prevent uncontrolled releases to soil, groundwater, or surface water through a combination of:

i. primary containment,
ii. secondary containment,
iii. monitored transfer practices,
iv. controlled drainage and run-on / run-off segregation, and
v. leak detection and alarm response.

Unless otherwise specified, secondary containment systems will consist of engineered bermed and lined containment. Where double-walled tanks with interstitial monitoring are utilized (e.g., bulk and day aqueous ammonia tanks), a curbed concrete containment pad is provided in lieu of earthen berming. Containment areas will be configured to prevent stormwater commingling with chemical-contaminated liquids, and will be managed under site spill response procedures.

All containment and transfer systems will be designed in accordance with Alberta Environmental Protection and Enhancement Act (EPEA) and applicable codes and standards for above-ground storage systems.

5.6.1 General Design Features Applicable (All Chemical Storage / Transfer Areas)

Primary containment:

- Storage tanks, totes, day tanks, pumps, filters, and associated piping are designed as closed systems with valved isolation at battery limits and at key equipment interfaces.
- Transfer hoses and connections will be compatible with the chemical service, fitted with dry-break or camlock-style connections as appropriate, and provided with isolation valves at the receiving end.

Secondary containment:

- Bermed containment with an impermeable liner and sealed penetrations.
- Containment floors graded to a low-point sump to localize any leaked liquid for detection and controlled removal.
- No direct drains from chemical containment areas to soil, stormwater, or the stormwater retention pond.

Run-on / run-off controls:

- Chemical containment berms are configured to exclude clean runoff from entering contained areas (graded away and/or curbed), and to prevent any contained liquids from migrating off-pad.
- Where roof runoff or surface runoff could encroach on chemical handling areas, curbing/diversion grading is used to keep runoff "clean" and segregated from contained chemical pads.

Leak detection and monitoring

- High-high (HH) level alarms on storage tanks and day tanks (overfill protection), configured to the DCS.
- Containment sump level switch (or high-level alarm) within bermed areas to indicate a leak / accumulation.
- Where double-walled tanks are used (e.g., bulk ammonia storage), interstitial space monitoring (leak sensor and alarm).
- Routine operator inspection rounds and documented inspection frequencies (valves, hoses, pumps, tank appurtenances, berm integrity).

Special handling

- Chemical handling areas will be controlled-access, signed, and provided with spill kits and appropriate PPE requirements.
- Transfer operations will be proceduralized (unloading checklist, attendance requirements, emergency stop / isolation steps, verification of available containment capacity prior to offload).

5.6.2 Cooling Glycol System – Expansion/Storage, Filtration, and Pumps

Each modular power plant includes a closed-loop 50 / 50 glycol circuit with an expansion and storage tank, side-stream filtration vessel and pump, and circulating pumps located within a common bermed containment area as shown on the PFD.

Primary containment

- Expansion / storage tank with closed piping connections, isolation valves, and level indication.
- Side-stream filtration package and pump installed with isolation valves and provisions for controlled filter change-out.
- Circulating pumps installed with curbing / contained base and isolation capability.

Secondary containment

- Bermed and lined pad encompassing the expansion/storage tank and glycol equipment (tank, filters, and pumps).

Leak detection / control

- Tank level monitoring (HI / HH and LO / LL alarms) to detect abnormal losses or overfill.
- Berm sump high-level alarm to indicate leakage accumulation.
- Differential pressure indication across side-stream filter to manage fouling and avoid seal damage conditions.
- No routine discharge - any collected liquids are removed via controlled recovery (e.g., vacuum truck) and managed as regulated waste as applicable.

5.6.3 Condensate Storage, Deaeration and Filtration

Each modular plant includes a condensate storage function and dissolved gas control (deaeration), with redundant condensate filtration (1 × 100% duty + 1 × 100% standby) as part of the closed-loop steam/condensate cycle.

Primary containment

- Condensate tank and associated piping designed as a closed system with isolation valves and level control.
- Condensate filters installed with isolation / bypass valving and provisions for controlled drain-down during maintenance.

Secondary containment

- Condensate tank is installed on a curbed pad (or within localized containment), sized to capture credible leaks from tank nozzles/pumps.
- Any tank drains are routed to a controlled collection point (not to stormwater).

Leak detection / control

- Tank level control with HH / LL alarms.
- Pump seal leak indication (where provided by vendor packages) and local drip trays/curbing.
- Filter differential pressure monitoring and controlled drain-down to contained collection.

5.6.4 Boiler Feedwater Chemical Injection – Tote Storage and Metering

Each modular plant includes an independent chemical injection and control skid (Solenis or equivalent) with bulk chemicals stored in 1 m^3 totes. The system is designed to avoid any routine discharge and to ensure any spill is captured and recoverable.

Primary containment

- Chemical tote connections and metering pumps are hard-piped or hose-connected within a controlled skid boundary, with isolation valves at tote outlets and injection pump suctions.
- Injection quills/points are designed to prevent backflow and include check valves where required.

Secondary containment

- Each tote is stored within dedicated bermed containment sized for ≥110% of the tote volume (1 m^3), stored inside each power plant building.
- Containment is lined and configured to prevent infiltration to soil.

Leak detection / control

- Visual level indication on totes (or mass tracking) and low-level alarms provided on the skid to prevent pump run-dry.
- Berm sump or localized leak alarm (where installed) to identify spills early.

Special handling

- Compatibility labeling, SDS availability, and segregation of incompatible chemicals (e.g., oxidizers vs organics) within the chemical storage area.

5.6.5 Aqueous Ammonia (19%) – Day Tanks

Each modular plant includes a day tank sized to support 24 hours of full-load operation for the applicable SCR mode.

Primary containment

- Closed day tank with isolation valves, level monitoring, and metered discharge to the ammonia injection skid.
- Backflow prevention/check valves on dosing lines as required by the package design.

Secondary containment

- Double walled tank with interstitial monitoring, on a concreted curbed pad.

Leak detection / control

- HI / HH and LO / LL alarms on day tank.
- Curbed pad drainage collection point for visual inspection and controlled removal.
- Ammonia area gas detection (NH_3 detectors) located near day tank / injection skid area (alarm to local annunciation and control system).

5.6.6 Aqueous Ammonia (19%) – Bulk Trucked-In Storage and Transfer (Site System)

A centralized bulk aqueous ammonia storage and transfer system supplies the modular plants through controlled pumping and distribution.

Primary containment

- Bulk tank designed for aqueous ammonia service with controlled fill connection, isolation valves, and overfill protection.
- Transfer pumps located within the bulk tank containment area, with isolation on suction / discharge and non-return provisions.
- Controlled distribution to each plant's day tank / dosing skid.

Secondary containment

- Double walled tank with interstitial monitoring, on a concreted curbed pad.

Leak detection / control

- Tank level with independent high-high shutdown (overfill prevention).
- Interstitial monitoring for double-wall tank (for bulk ammonia).
- Curbed pad drainage collection point with visual inspection and recovery points.

5.6.7 Truck Offloading Containment Pad (Drive-Through Grated Berm)

Trucked-in fluids (including aqueous ammonia and treated water) are offloaded within a dedicated contained unloading area (approximately 80 ft × 40 ft) configured to capture and retain spilled liquids during transfer operations.

Primary containment

- Offloading connections with isolation valves at the receiving side.
- Attended transfers, with a documented offload checklist and emergency isolation steps.

Secondary containment

- Grated / curbed containment area with an impermeable base / liner and graded to a sump.
- Containment capacity to be sized to accommodate a credible truck spill scenario (design basis to be finalized once typical tanker volume is confirmed for each fluid service).

Leak detection / control

- Sump level alarm and visual indication.
- No discharge to stormwater – any collected liquids are removed by licensed vacuum services and managed based on fluid type.

5.6.8 Treated Water Storage (TWS) Tank – Curbed Operational Containment

The Treated Water Storage (TWS) tank contains demineralized / deoxygenated water for boiler feedwater supply and is not classified as hazardous chemical storage. Regardless, it is bermed to provide operational containment, leak management, and to avoid uncontrolled discharge pathways.

Primary containment

- Storage tank with level monitoring and controlled transfer pumps.

Secondary containment

- Concreted curbed containment pad sloped to a controlled low point..

Leak detection / control

- Tank level alarms (HH/LL).
- Berm sump high-level alarm.

5.6.9 Waste Storage, Temporary Accumulation, and Disposal Controls

Potential maintenance-related wastes include used lube oil, oil-contaminated solids, spent SCR catalyst, spent glycol (non-routine), and minor ammonia residues (non-routine). These materials are managed to prevent releases.

Controls

- Temporary storage in sealed, compatible containers located within curbed/bermed containment.
- Segregation of incompatible wastes.
- No long-term uncontrolled accumulation; removal by licensed waste contractors.
- Spent SCR catalyst staged in contained laydown or bins to prevent contact with soil and precipitation until removal.

5.6.10 Stormwater / Runoff Containment and Control

Stormwater management at the Project site is designed to prevent contact between uncontaminated runoff and process areas, chemical storage systems, or waste handling zones.

5.6.11 Segregation of Clean vs. Potentially Contaminated Runoff

The site grading plan directs:

- Clean roof runoff directly to ground drainage systems
- General yard runoff toward the shared stormwater retention pond
- Process-area runoff (within bermed containment areas) to contained collection systems

Stormwater does not enter any process equipment, chemical containment berms, or wastewater systems.

5.6.12 Chemical and Process Area Isolation

All chemical storage areas (ammonia, glycol, BFW chemicals) are:

- Located within lined secondary containment berms
- Hydraulically isolated from general site drainage
- Designed without direct stormwater connection

Runoff entering bermed containment areas (e.g., precipitation) is:

- Visually inspected prior to removal
- Pumped out only if uncontaminated
- Otherwise managed as controlled waste

No chemical containment area drains to the stormwater pond.

5.6.13 Stormwater Retention Pond

The site includes a natural, lined stormwater retention pond designed to:

- Collect and attenuate site runoff
- Reduce peak discharge rates
- Provide sediment settling prior to discharge

The pond receives only non-process stormwater. No process blowdown, cooling water, chemical drainage, or condensate streams are routed to the stormwater system.

5.6.14 Run-On / Run-Off Controls

The site incorporates:

- Engineered grading away from chemical storage areas
- Defined swales and drainage paths
- Elevated equipment pads
- Curbed hardstand surfaces in process zones

These measures prevent stormwater run-on into hazardous material areas and prevent run-off from contained areas to surrounding soil.

5.6.15 Truck Offloading Containment Area

The truck offload area (80' × 40' grated bermed pad) is:

- Fully bermed
- Hydraulically isolated from stormwater drainage
- Designed to contain potential spills during transfer

Collected liquids are removed by licensed industrial vacuum service. No discharge from this area enters the stormwater pond.

5.6.16 Appendix C Above Ground Storage Tank List

Refer to Appendix C at the end of this document for a tabulated list of all tanks located on site as per EPEA guidelines.

Tanks are grouped by chemical service (NH_3 truck offload + bulk tanks, then distribution to day tanks near SCR). Containment is service-appropriate (double-wall + monitoring for NH_3; lined berm for glycol; tote containment cells for BFW chems).

5.6.17 Diesel Tank Storage

Diesel tank storage location is as shown in figure 5.6.1 and as described in 5.5.7.

Each emergency diesel generator is equipped with an integral diesel fuel storage tank mounted beneath the generator package. The belly tanks provide on-site fuel storage for emergency operation and routine testing activities. Tank capacity ranges from 17,000 L to 34,000 L depending on final equipment selection.

Primary containment

- Integral diesel fuel belly tank incorporated into the generator package.
- Tank designed and fabricated specifically for diesel fuel service.

- Nominal storage capacity of 17,000 L - 34,000 L per generator.
- Tank equipped with fuel fill connection, supply and return connections, level indication, venting provisions, and isolation valves as required.
- Fuel transfer directly between the storage tank and associated diesel engine fuel system.
- No bulk diesel fuel storage tanks are proposed for the facility.

Secondary containment

- Double-walled tank construction providing integral secondary containment.
- Continuous interstitial space between primary and secondary tank walls.
- Tank designed to contain the full inventory of the primary tank in the event of an internal tank failure.
- Generator and tank assemblies installed on prepared foundations in accordance with manufacturer requirements.

Leak detection / control

- Interstitial vacuum pressure switch provided to continuously monitor integrity of the double-wall tank annulus.
- Interstitial liquid level detection switch provided to identify liquid accumulation within the annular space.
- Alarm indication provided locally and/or to the facility control system upon loss of interstitial vacuum or detection of liquid in the annulus.
- Independent tank level monitoring.
- High-high level indication and overfill prevention provisions during fuel delivery.
- Visual inspection of tank, piping, fittings, and associated equipment during routine maintenance activities.
- Fuel transfer operations conducted in accordance with site operating procedures and spill prevention practices.

Pressure / venting

- Tanks equipped with atmospheric venting suitable for diesel fuel service.
- Venting provided to accommodate thermal expansion, contraction, and fuel transfer operations.
- Diesel fuel is classified as a combustible liquid and exhibits low volatility under normal ambient conditions.
- No vapour recovery system is provided due to the low vapour pressure of diesel fuel and the negligible vapour emissions generated during normal storage and transfer operations.
- Vent discharges are directed to the atmosphere in accordance with applicable codes and manufacturer requirements.

Fuel delivery and overfill protection

- Diesel fuel is delivered to individual generator belly tanks by licensed fuel suppliers using mobile fuel delivery vehicles.
- Fuel deliveries are supervised by trained personnel and conducted in accordance with site operating procedures.
- Tank level instrumentation provides local indication of tank inventory.

- Independent high-level alarm and overfill prevention measures are provided to prevent overfilling during fuel transfer operations.
- Delivery operations are immediately terminated upon activation of overfill alarms or abnormal operating conditions.

The integral belly tank arrangement minimizes fuel handling requirements, eliminates the need for centralized bulk diesel storage facilities, and reduces the quantity of above-ground fuel transfer piping located on site. The system is intended solely to support emergency generator operation, black-start capability, and routine testing activities.

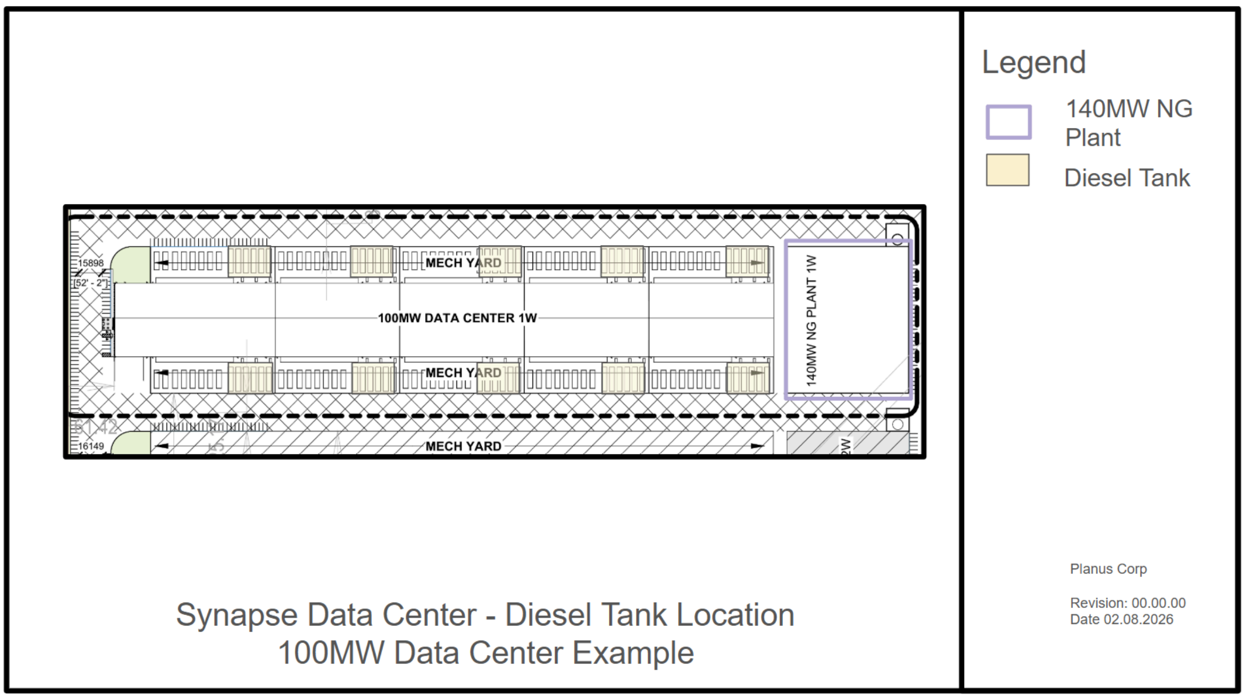

Figure 5.6.1 - Diesel Storage Tank Location

5.6.18 Diesel Exhaust Fluid (DEF) - Local Storage and Distribution Tanks (Per Six-Generator Blocks)

Each group of six emergency diesel generators is supplied by a dedicated Diesel Exhaust Fluid (DEF) storage and distribution system designed to support SCR operation during emergency generator operation and testing. DEF is stored locally adjacent to each generator block and distributed to the individual generator day-use systems through dedicated transfer piping.

Primary containment

- One dedicated DEF storage tank per six-generator block.
- Nominal tank capacity of 6 m^3.
- Tank dimensions approximately 2.0 m diameter × 1.9 m height.

- Tank construction of DEF-compatible high-density polyethylene (HDPE) or 316 stainless steel.
- Fill connection, isolation valves, level indication, and overflow provisions.
- Dedicated transfer piping to the associated diesel generator SCR reagent system.

Secondary containment

- Double-walled storage tank with integral secondary containment.
- Continuous interstitial space monitoring for leak detection.
- Installed on a concreted curbed pad designed to contain any unlikely release from associated piping, valves, or fittings.

Leak detection / control

- Continuous interstitial leak detection monitoring.
- Tank level monitoring with independent high-high level alarm for overfill prevention.
- Overflow routed to the surrounding curbed containment area.
- Curbed pad equipped with inspection and recovery provisions.
- Routine visual inspection of tank, piping, fittings, and containment area.

Pressure / venting

- DEF is a low-volatility aqueous urea solution with a maximum true vapour pressure of approximately 0.08 kPa(a) at 20°C and does not present a significant vapour emission source during normal operation.
- Tanks are equipped with a pressure-vacuum relief valve (PVRV) set at approximately 10 kPa to protect the tank from abnormal filling, thermal expansion, or withdrawal conditions.
- Normal tank venting is directly to atmosphere.
- No vapour recovery, vapour treatment, or emissions control equipment is required for the DEF storage system.

The DEF storage and distribution system is intended solely to support emergency diesel generator operation and periodic testing activities. Due to the low volatility and non-flammable nature of DEF, the system does not constitute a significant source of atmospheric emissions.

5.7 Performance Monitoring and Leak Detection Verification

This section outlines the monitoring programs, automated instrumentation, and proceduralized inspections used to evaluate the ongoing performance of chemical collection and storage elements and to verify the integrity of leak detection systems.

5.7.1 Automated Instrumentation and Real-Time Monitoring

The facility utilizes a centralized Distributed Control System (DCS) to provide continuous monitoring and early-warning detection for all primary storage and secondary containment elements. Key monitoring parameters include:

- **Tank Level Monitoring**: All bulk and day tanks (including 19% aqueous ammonia and glycol storage) are equipped with continuous level transmitters. These systems utilize

High-High (HH) and Low-Low (LL) alarms to identify abnormal inventory fluctuations that could indicate a primary containment compromise or an impending overfill event.

- **Interstitial Monitoring**: Double-walled storage tanks for aqueous ammonia (T-A-100/110 and T-A-BS-100/102) incorporate liquid sensors within the interstitial space (annulus) between the primary and secondary tank shells. Any detection of fluid in this space triggers an immediate DCS alarm for interstitial integrity failure.
- **Secondary Containment Sump Monitoring**: Lined berm sumps for chemical storage and transfer areas are equipped with high-level switches or alarms. These sensors provide real-time notification of liquid accumulation (precipitation or leaked process fluid), requiring operator verification prior to removal.
- **Atmospheric Gas Detection**: Fixed ammonia (NH_3) detectors are strategically positioned at the SCR day tanks, bulk storage areas, and truck offloading pads. These detectors provide local annunciation and control-room alarms to identify fugitive vapour releases before they migrate off-pad.

5.7.2 Physical Inspections and Proceduralized Verification

In addition to automated systems, the facility implements a routine inspection program to ensure the mechanical integrity of non-instrumented containment elements:

- **Berm and Liner Integrity**: Operators are to perform documented weekly inspection rounds to verify the physical condition of secondary containment berms and impermeable liners. Any evidence of cracking, degradation, or unsealed penetrations is reported as a corrective maintenance item.
- **Vapour Control Performance**: Vent treatment systems (packed scrubbers) on bulk ammonia storage tanks are monitored for flow and chemical effectiveness to ensure atmospheric vents remain within permitted limits.
- **Storage Tote Monitoring**: Smaller 1 m^3 BFW chemical totes (Oxygen Scavenger, Corrosion Inhibitor, Anti-Scalant, and pH Control) are monitored via daily visual level checks at the injection skids to verify correct dosing and detect potential leakage within the individual bermed containment cells.

5.7.3 Leak Detection System Testing and Calibration

To ensure the reliability of monitoring systems, the facility adheres to a defined preventative maintenance schedule:

- **Instrument Calibration**: Level transmitters, sump switches, and gas detectors are calibrated annually or as per manufacturer recommendations to prevent "drift" and ensure alarm setpoint accuracy. Critical switches, which hold sensitive safety, environmental, or integrity functions, are to be function tested and calibrated at elevated intervals.
- **Simulation Testing**: High-level and overfill protection interlocks (SIS) are periodically function-tested to verify they accurately trigger isolation or pump-trip sequences as designed.

5.8 Wastewater Reuse, Treatment, and Release Control

This section describes the integrated water management strategy designed to minimize raw water demand and eliminate routine process wastewater discharge through internal recovery and reuse.

5.8.1 Wastewater Minimization and Reuse (Process Water)

The Project has been designed to minimize wastewater generation through the use of closed-loop process systems, recovery and reuse of process water, and evaluation of advanced water treatment technologies. Current engineering studies indicate that wastewater generation associated with steam-cycle operation may be substantially reduced compared to conventional combined-cycle facilities and may potentially be eliminated during normal operation depending upon final steam generation and water treatment technology selection.

Collection Strategy: All high-quality wastewater streams, including HRSG blowdowns (continuous and intermittent), sample conditioning drains, and demister condensates, are collected in the Condensate Storage Tank (V-BFW-001) or a centralized collection header. While the WRS recovers mass, the sensible heat from the drains is considered part of the minor thermal losses already accounted for in the 53.4 MW_{th} stack loss.

Proposed Treatment (WRS): Collected water is routed to a package treatment system (Solenis or equivalent) utilizing Filtration and Reverse Osmosis (RO).

Reuse Method: Treated permeate is returned directly to the Condensate Storage Tank for use as Boiler Feedwater (BFW), effectively closing the loop and reducing makeup demand to approximately 1.0 m^3/day per plant.

Reject Management: RO reject (concentrate) is stored in a dedicated tank and periodically removed from the site by a licensed waste contractor for disposal at an approved facility. There is no routine liquid process discharge to soil or surface water.

The Project has been designed to minimize wastewater generation and raw water consumption through the use of closed-loop steam-cycle systems, aggressive recovery and reuse of process water streams, and ongoing evaluation of advanced water treatment technologies. The overall design objective is to maximize internal water recovery, minimize process losses, and reduce long-term make-up water requirements to the greatest extent practical.

For the HRSG-based configuration, all recoverable process water streams, including continuous and intermittent blowdowns, sample conditioning drains, demister condensates, equipment drains, and other high-quality wastewater streams, are collected and returned to the water recovery system. Where practical, condensable vapour streams are condensed and returned to the process in order to further reduce water losses. Through implementation of these recovery measures, the HRSG configuration is being designed to achieve an average make-up water demand of approximately 2 m^3/day per plant while maintaining boiler water chemistry and equipment reliability requirements.

Collection Strategy: All recoverable process water streams are collected through dedicated drain systems and routed to a centralized collection header, condensate storage system, or water recovery system as appropriate. High-quality condensates are preferentially returned directly to the condensate cycle wherever practical.

Proposed Treatment: Water recovery technologies under evaluation include filtration, reverse osmosis (RO), electrodeionization (EDI), and other zero-liquid discharge (ZLD) advanced treatment technologies intended to continuously maintain condensate and feedwater quality while maximizing water recovery and reuse. The intent of all recycling processes is to achieve disposal of dry solids rather than contaminated liquids.

Reuse Method: Recovered water is returned to the condensate and boiler feedwater systems for reuse within the steam cycle, thereby minimizing external make-up water requirements and reducing wastewater generation.

OTSG Evaluation: The Project is also evaluating Once-Through Steam Generator (OTSG) technology as an alternative to conventional HRSG systems. Preliminary engineering evaluations indicate that OTSG technology may eliminate routine boiler blowdown requirements, reduce boiler water treatment chemical consumption, simplify water chemistry management, and further reduce make-up water demand beyond that achievable using the HRSG configuration. The OTSG configuration may also eliminate the need for Zero Liquid Discharge (ZLD) systems and their associated evaporative losses.

Residual Waste Streams: Any residual waste streams not suitable for direct reuse will be managed through the selected water treatment process and disposed of in accordance with applicable regulatory requirements. No routine process wastewater discharge to soil or surface water is proposed.

5.8.2 Stormwater and Runoff Management

Stormwater is managed independently of process water to prevent contamination. Surface runoff will be conveyed to the stormwater reservoirs through a combination of surface flow and underground piped flows. The stormwater reservoirs will each be designed to store stormwater up to and including the 1:100 design flood event. The reservoir will be lined and equipped with oil separation and monitoring. In the event of non-contaminated surcharge beyond this capacity, the reservoirs will discharge overland into the natural drainage swale that exists immediately east of the Project lands or into the north ditch of Highway 27.

In the event of contamination the reservoir will be emptied for offsite treatment.

Location of stormwater run-off pond: 51°48'05.2"N 114°05'07.9"W

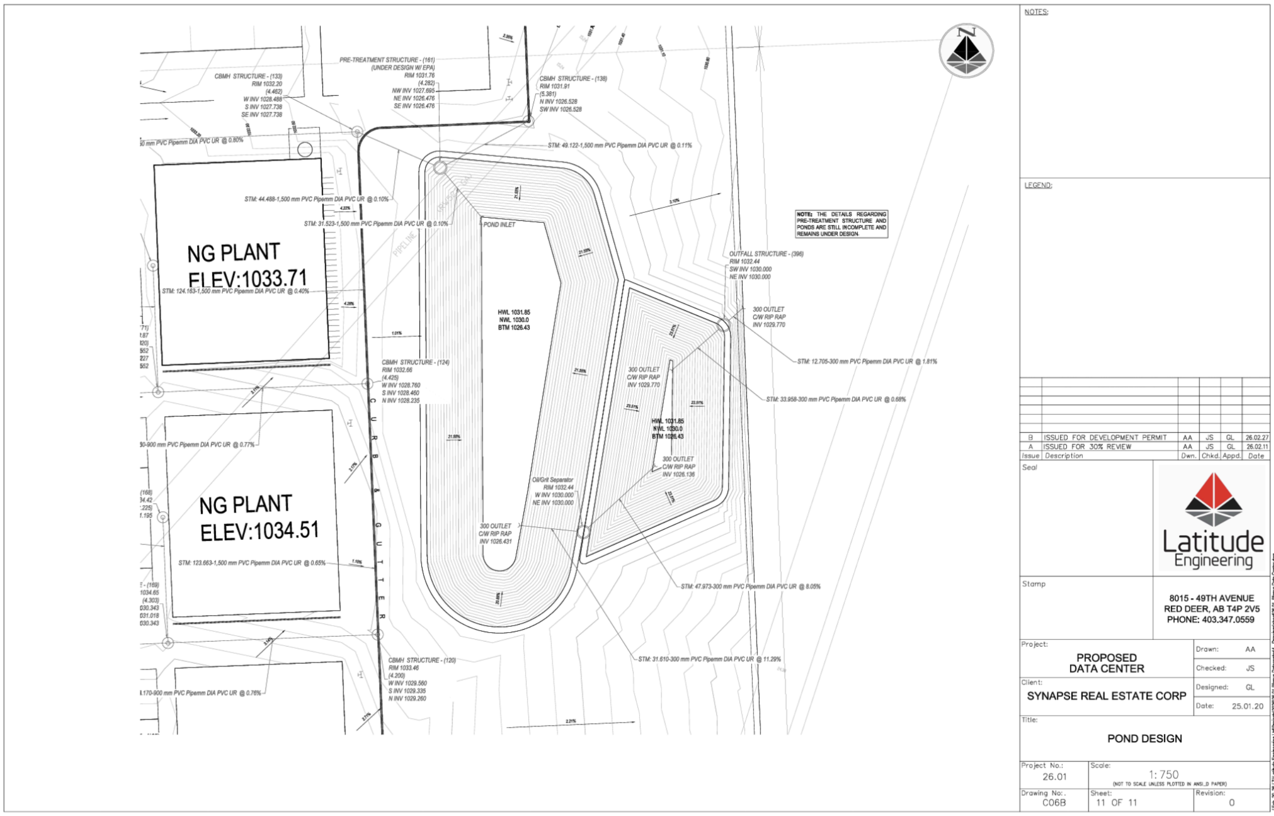

Figure 5.8.2.1 - Stormwater runoff pond schematic

Normal Storm Water Volume

Daily: 363 to 2,776m^3 (average 1,128m^3)
Monthly: 10,151 m^3 to 83,342 m^3
Annual Average: 411,167 m^3

Predicted rainfall: See figure 4.6.4 and 4.6.5 for local precipitation ranges

5.8.3 Domestic Wastewater

Domestic wastewater from administrative and maintenance facilities is connected to the municipal sewer system for disposal.

Water Consumption
Normal volume (daily/monthly): 18,675 L/day (for domestic consumption)

Flow rate: Normal 0.432L/s
Maximum: 1.73L/s

Wastewater
Design occupancy assumptions are 50/50 male to female ratio, with 60% of staff on-site during the day and 40% off hours(i.e. outside of Monday to Friday 9am to 5pm). Onsite lift station is sized for peak domestic waster water removal of of 1080 GPS(47L/s). See figure 5.8.3.1 for domestic and water and sanitary main schematic.

Figure 5.8.3.1 - Domestic Sanitary Main to Town of Olds

5.8.3 Summary of Volumetric Rates (Normal / Upset)

Stream	Normal Rate (per plant)	Upset / Maintenance Rate	Release Method
Boiler Blowdown	5,000 kg/h	Intermittent spike	Recycled via WRS
WRS Reject	5 – 10 L/h	Variable	Trucked off-site
Process Makeup	< 1.0 m^3/d	2.0 m^3/d	N/A (consumption)
Stormwater	WQFR 11.2 m3/s	Bypass to pond at 150% WQFR Pond size of 83,600 m3 for 1-in-100 year event	Retention pond with overflow of non contaminated water to normal watercourse

5.9 Suitability and Capacity Assessment of Treatment and Release Systems

The Project design philosophy prioritizes pollution prevention at the source through the elimination of continuous liquid effluent streams. Consequently, the traditional assessment of impacts on receiving watercourses is not required for this facility, as the site is designed as a Zero Process Liquids Discharge (ZPLD) facility.

5.9.1 Elimination of Watercourse Release Pathways

Process Water: The steam and water systems operate as closed loops. All internal blowdowns and sample conditioning streams are recovered, treated via a dedicated Water Recovery System (WRS), and returned to the condensate cycle.

Cooling Water: The facility utilizes 100% dry cooling (Air-Cooled Condensers and Radiators). This eliminates the need for once-through cooling water intake from or discharge to nearby watercourses.

Reject Management: Concentrated residuals from the WRS are stored in contained tanks and removed by licensed third-party contractors for off-site disposal, ensuring no process-related toxicity enters the local watershed.

5.9.2 Stormwater Management Capacity

Site runoff is managed via a shared stormwater retention pond designed to attenuate peak flows and provide sediment settling prior to discharge. All chemical storage and transfer areas are hydraulically isolated from the stormwater system via secondary containment berms, preventing the release of hazardous substances during precipitation events.

5.9.3 Compliance with Technology Benchmarks

The evaluation of Dry Cooling (Alt C and E) represents the best available technology (BAT) for water conservation in power generation. This approach aligns with provincial regional outcomes for water use minimization and the protection of aquatic ecosystems by removing the thermal and chemical loading associated with industrial wastewater.

5.9.4 Contingency Planning

In the event of a WRS failure, process wastewater is retained within the Condensate Storage Tank (V-BFW-001) or redirected to temporary on-site storage for trucked disposal. Comprehensive secondary containment and leak detection systems provide a primary defense against unpermitted releases to the environment.

5.10 Location of Treatment and Recovery Facilities

The Project does not utilize environmental disposal locations (such as outfalls to watercourses or irrigation fields), as all process water is managed within a Zero Process Liquid Discharge (ZPLD) framework. Consequently, this section identifies the on-site recovery facilities and centralized collection points relative to the environmental considerations detailed in Section 4.

5.10.1 Facility Coordinates and Site Integration

The recovery and containment infrastructure is consolidated within the industrial zoned boundary (LSD 04-33-1-W5M) to minimize the footprint on CLI Class 1 agricultural soils.

- **Water Recovery System (WRS)**: Located within the main utility hall of each power plant building.
- **Aqueous Ammonia Bulk Storage (T-A-BS-100/102)**: Situated adjacent to the truck offloading containment pad to minimize transfer distances.
- **Stormwater Retention Pond**: Located in the southeast corner of the site, following the natural topographical low point (1029 mASL) identified in Section 4.1.

5.10.2 Relation to Section 4 Environmental Considerations

Recovery systems are located on engineered, level pads to prevent run-on/run-off interference with the southern-sloping topography. All treatment and storage elements are installed within lined secondary containment to protect the shallow groundwater table (2.35 m to 4.19 m below grade).

By utilizing a closed-loop design, the project maintains a zero-discharge status relative to the ephemeral draw and the Order 1 tributary of Lonepine Creek located south of Highway 27. Infrastructure is consolidated to minimize the permanent loss of high-quality Canada Land Inventory (CLI) Class 1 agricultural soils.

5.10.3 Disposal Logic (Off-Site)

There are no "disposal locations" within the Local Study Area (LSA). Concentrated RO reject is stored in contained tanks and hauled via licensed vacuum truck to an approved third-party disposal facility. Domestic water is disposed of through the municipal sewer system to the municipal treatment facility. Stormwater is released only from the retention pond after verifying it meets applicable surface water quality guidelines.

5.11 Performance Evaluation of Recovery and Reuse Systems

This section details how the facility confirms the efficiency of its internal water recovery.

Treatment Performance (WRS): The Water Recovery System (WRS) will be monitored via online conductivity and flow meters at the inlet and outlet of the RO package to ensure the permeate meets boiler feedwater specifications.

Reuse Quantity: Flow meters installed on the return line from the WRS to the Condensate Storage Tank (V-BFW-001) will track the total volume of water reused, providing data to verify the anticipated 98%+ recovery rate.

WRS Reject Monitoring: The volume of concentrated RO reject will be metered as it enters the storage tank to coordinate off-site hauling schedules.

5.12 Release Monitoring (Stormwater Only)

Because the project follows a Zero Process Liquid Discharge philosophy, there is no routine monitoring for process wastewater toxicity.

Stormwater Quantity: The shared stormwater retention pond will be monitored for level, specifically following 1-in-100-year precipitation events, to manage release rates into the southern drainage draw.

Stormwater Quality: Prior to any controlled release from the retention pond, a grab sample will be analyzed for pH, Total Suspended Solids (TSS), and visual evidence of hydrocarbons to ensure compliance with the Environmental Quality Guidelines for Alberta Surface Waters.

5.13 Ambient Monitoring (Groundwater and Soil)

Given that groundwater is shallow (2.35 m to 4.19 m) and the site sits on CLI Class 1 agricultural soil, ambient monitoring is a critical "defensive" measure for the site permit.

Groundwater Monitoring: A network of monitoring wells (upgradient and downgradient) will be established to establish baseline conditions and perform annual sampling for pH, electrical conductivity, and chemical constituents related to the stored reagents (e.g., ammonia and glycol).

Soil Monitoring: Baseline soil chemistry has been established via borehole sampling in 2026. Periodic soil monitoring may be conducted in high-traffic areas, such as the Truck Offloading Containment Pad, to verify that the 80' × 40' grated berm is successfully preventing soil infiltration.

5.14 Data, Calculations, and Models

Mass Balance Verification: The overall site mass balance (0.97% closure) serves as the primary model for quantifying anticipated outputs and verifying that all combustion-related water is exiting via the stack rather than through a liquid pathway.

Retention Capacity: Engineered secondary containment systems (bermed where applicable, or curbed containment pads for double-walled tanks) are designed to contain 110% of the largest single vessel volume, where required by regulation.

Toxicity: Since process residuals are managed as regulated waste and trucked off-site, no surface water toxicity modeling is required for the local study area (LSA).

5.15 Substances Released Directly or Indirectly to Air

Atmospheric emissions from the facility are primarily the result of natural gas combustion within the gas turbine generators (GTGs) and supplemental duct burners. These substances are managed through high-efficiency combustion design and post-combustion emissions control systems.

5.15.1 Primary Combustion Exhaust (Main Stacks)

The main exhaust stream from each 140 MW modular block consists of the following substances:

1. **Carbon Dioxide (CO_2)**:
    - **Source**: Oxidation of carbon-based fuel in GTGs and duct burners.
    - **Quantity**: 59,983 kg/h per plant (599,830 kg/h site-wide maximum).
    - **Characteristics**: Greenhouse gas; disperses globally with no localized toxic effects.
    - **Release Method**: Discharged via 2-stack integrated HRSG exhaust system at a height designed for optimal dispersion.
2. **Nitrogen Oxides (NO_x)**:
    - **Source**: Thermal and prompt formation during high-temperature combustion.
    - **Quantity**: 8.46 kg/h per plant (based on 2.35 g/s design basis).
    - **Concentration**: Controlled to a maximum of 5 ppmvd @ 15% via SCR.
    - **Release Method**: Continuous stack discharge following catalytic reduction.
3. **Water Vapour (H_2O)**:
    - **Source**: Chemical reaction of fuel-bound hydrogen and ambient humidity.
    - **Quantity**: 30,301 kg/h per plant.
    - **Characteristics**: Non-hazardous; visible plume potential under specific ambient conditions.
4. **Carbon Monoxide (CO)**:
    - **Source**: Incomplete oxidation during combustion.
    - **Quantity**: 25.5 kg/h per plant.
    - **Concentration**: Minimized through automated combustion tuning and control.

5.15.2 Auxiliary Equipment Emissions

1. **Fuel Gas Line Heaters**:
    - **Source**: Regulated low-pressure slipstream of natural gas used for fuel conditioning.
    - **Quantity**: Minor, proportional to the temperature differential required for pressure reduction.
    - **Release Method**: Discharged via dedicated small-diameter vents to the inlet duct of the respective power house SCR system for emissions conditioning.

2. **Emergency Diesel Generators**
   - **Source**: Combustion of diesel fuel
   - **Quantity**: Varies depending on plant reliability See attachment Air Quality Dispersion Modelling Assessment(June 12th) case 3 and 4
   - **Release Method**: Discharged through high velocity stacks. One stack for every six generators
3. **Emergency Fire Suppression (Non-Routine)**:
   - **Substance**: Compressed Carbon Dioxide.
   - **Occurrence**: Released only during fire suppression events or system testing.
   - **Fate**: Rapid atmospheric dispersion within enclosed turbine compartments.

5.16 Atmospheric Transport and Fate Summary

All major process emissions are discharged through vertical, high-velocity exhaust stacks to maximize plume rise and atmospheric dilution. Emissions are subject to prevailing west-southwest winds as identified in Section 4.2. Plume dispersion has been modeled using AERMOD to ensure ground-level concentrations remain below the Alberta Ambient Air Quality Objectives (AAAQO).

Emergency Generators
In the event of a power interruption to the Data Center requiring emergency diesel power generation that would exceed emission and/or noise limits >1% of a calendar year (87.6 hours), the facility would be safely shut down, unless otherwise permitted by regulatory authorities. See Attachment Air Quality Dispersion Modelling Assessment(June 12th) Case 3 and Case 4.

5.17 Advanced Air Emission Control Systems and BATEA Application

The Project incorporates a multi-layered approach to emissions management, utilizing high-efficiency combustion, advanced catalytic reduction, and innovative thermal integration to minimize atmospheric releases. This strategy exceeds standard compliance to achieve industry-leading performance.

The Project is currently evaluating both conventional HRSG and OTSG steam generation technologies. Unless otherwise noted, references to steam generation equipment within this response apply to either configuration. The final technology selection will not alter the emissions performance commitments, SCR performance guarantees, or air quality modelling basis used for the Project.

5.17.1 Dual-Path Selective Catalytic Reduction (SCR) Strategy

The facility utilizes a versatile SCR architecture designed to maintain high NO_x removal efficiency across all operational phases and maintenance cycles.

Phase 1 / Maintenance Mode (High-Temperature Path): During simple-cycle operation or steam-cycle maintenance, exhaust gases (at ~550 °C) are routed through a Zeolite-based honeycomb catalyst. Zeolite is the BATEA standard for high-temperature stability, ensuring NO_x reduction remains effective even without the cooling effect of the HRSG.

Phase 2 / Normal Operation (Low-Temperature Path): During combined-cycle operation, exhaust heat is recovered in the HRSG/OTSG, reducing gas temperatures between 85 and 130 °C (depending on loading). For the HRSG configuration operating in this mode, the system utilizes a Vanadium-based honeycomb catalyst, implemented at a location within the HRSG that is optimized for peak de-NOx performance. In an OTSG configuration, the same SCR is utilized as in Phase 1 operation.

Physical Capacity: Each SCR unit is sized to treat the full exhaust mass flow of 1,049,919.2 kg/h per plant, ensuring a maximum ammonia slip of 5 ppmvd. Tier 2 emergency generators will use SCR to reduce NOx emissions and a diesel particulate filter to achieve Tier 4 equivalency. An oxidation catalyst will be installed if required as part of factory acceptance testing and emissions verification. These will be installed with each group of 6 emergency generators.

5.17.2 Innovative Fuel Gas Relief and Auxiliary Heat Recovery

The Project eliminates the need for a conventional flare stack by integrating relief gases into the process energy cycle.

Relief Gas Incineration: Unplanned fuel gas releases are captured by a Safety Instrumented System (SIS) and routed to enclosed duct burners within the HRSG. This converts potential fugitive emissions into useful thermal energy, with the resulting flue gas undergoing full treatment in the SCR for NO_x control.

Auxiliary Exhaust Integration: To eliminate even negligible discharge points, the exhaust from the fuel gas line heaters is duct-integrated into the nearest SCR. This ensures that auxiliary combustion products are subjected to the same high-efficiency SCR treatment as the main gas turbines, a practice that exceeds standard industrial "best practice."

5.18 Equipment Details and Specifications

The following tables summarize the design parameters for the primary combustion and heat recovery equipment. These specifications form the basis of the mass balance and air quality assessments for the 140 MW modular block.

5.18.1 Gas Turbine Generators (GTGs)

Parameter	Design Specification
Type	Heavy Duty
Rated Electrical Output	50 MW per unit (100 MW per plant)
Total Thermal Input	291 MW_{th} (for 140 MW plant block @ 48.1% efficiency)
Fuel Type	Natural Gas
NO_x Control	Selective Catalytic Reduction (SCR)
Emission Limit	5.0 ppmvd @ 15% O_2

5.18.2 Fired Heaters / Boilers (HRSGs)

At the time of filing, the Project is evaluating both conventional Heat Recovery Steam Generator (HRSG) technology and Once-Through Steam Generator (OTSG) technology for integration into the combined-cycle configuration. Final vendor selection has been intentionally deferred pending completion of detailed engineering evaluations, environmental optimization studies, and water management assessments. Both technologies remain technically viable and are capable of achieving the performance assumptions utilized in the Project's environmental assessments.

Parameter	Design Specification
Manufacturer / Model	Vendor TBD (Performance Specification Basis)
Type	Dual-Pressure Heat Recovery Steam Generator (HRSG)
HP Steam Output	140,000 kg/h @ 6,300 kPa and 495 °C
LP Steam Output	30,000 kg/h @ 600 kPa and 254 °C
NO_x Control	Selective Catalytic Reduction (SCR)
Emission Limit	5.0 ppmvd @ 15% O_2

5.18.3 Duct Burner (Supplemental Firing)

Parameter	Design Specification
Manufacturer / Model	Vendor TBD (Performance Specification Basis)
Capacity	70 – 80 MW_{th} replacement thermal contribution
Function	Maintain steam cycle availability during GT maintenance
Emission Control	Integrated with main plant SCR and BMS
Design Basis	At the design basis lower heating value (LHV) of the project natural gas, a supplemental firing input of 70–80 MWth corresponds to an estimated fuel gas consumption of approximately 4,900–5,400 kg/h, or approximately 6,500–7,100 Sm^3/h per modular block when operating in single-GTG maintenance mode.

5.19 Flare Pits

Not applicable.

5.20 Fugitive Emissions

Fugitive Volatile Organic Compound (VOC) emissions at the Plant could include VOCs from small leaks from piping/valves, etc. and tank vents. A Leak Detection and Repair (LDAR) program for the Plant, intended to identify and repair sources of fugitive emissions, will be developed and implemented upon award of the EPEA Approval.

5.21 Non Point Emissions

Not applicable.

5.22 Dispersion Modelling

See Attachment Air Quality Dispersion Modelling Assessment(June 12th)

5.23 Plant Scale Diagram - Emissions

Plant scale drawings are shown in figure 5.23.1 and 5.23.2. (10) stacks are directly adjacent to the 10 plants shown below. Each group of (6) emergency generators will exhaust through a shared common stack.

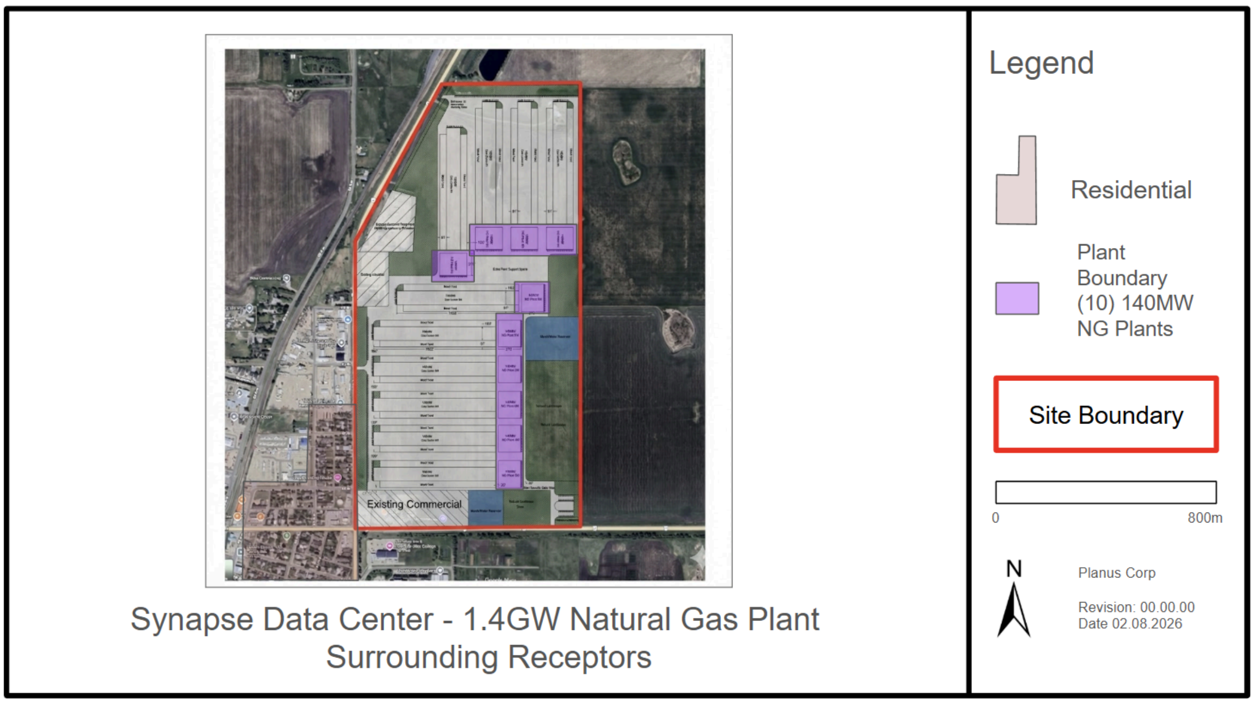

Figure 5.23.1 - Plant Scale Drawings

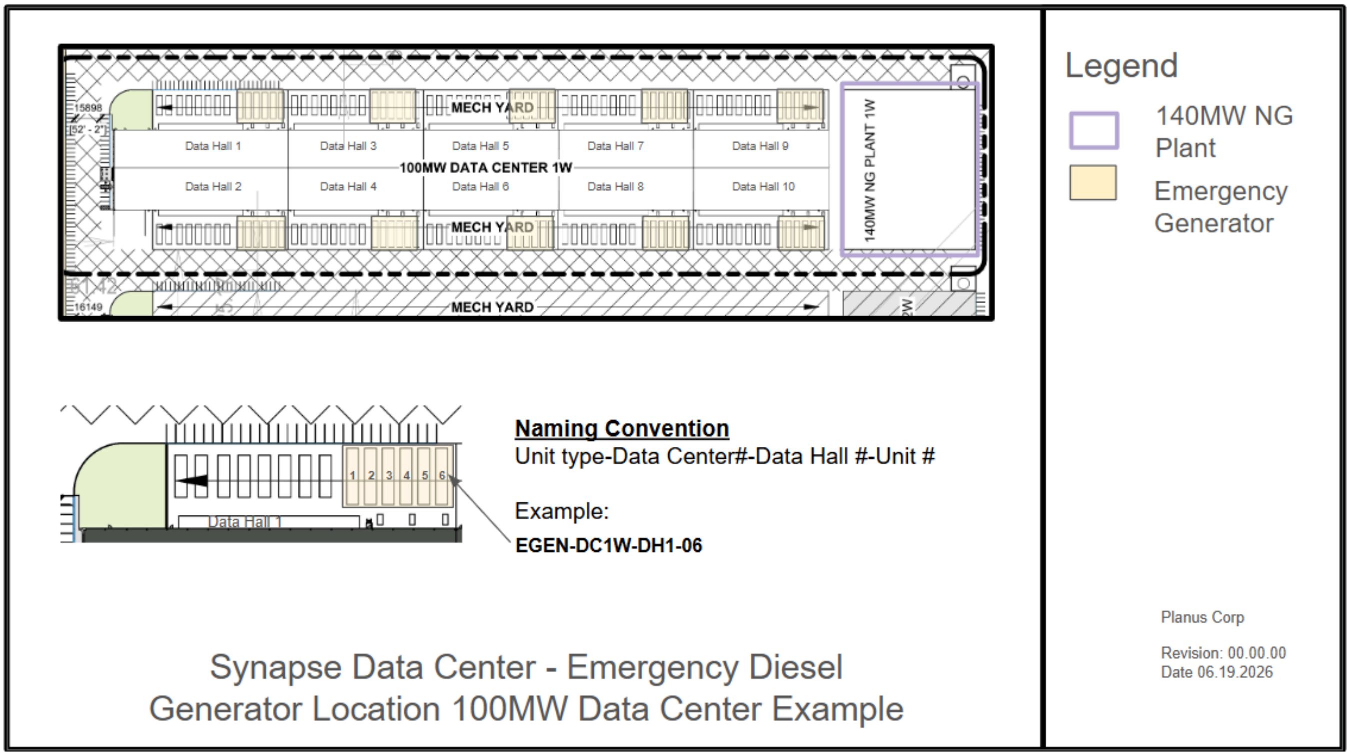

Figure 5.23.2 - Emergency Generator Location and Naming Convention for 100MW Data Center

5.24 Performance Monitoring - Air Emissions

As required for gas-fired power plants above 25 MW, a Continuous Emission Monitoring System (CEMS) will be installed on the main turbine exhaust stacks. The CEMS will monitor Nitrogen Oxides (NO_x), temperature and effluent flow-rate at a minimum. A CEMS Monitoring Plan will be prepared and submitted to AEPA for approval prior to purchase of the CEMS for the Plant.

5.25 Monitoring Location and Evaluation Criteria

Synapse may join the Parkland Airshed Management Zone (PAMZ). Alternatively, Synapse proposes to conduct passive monitoring for Total Dustfall and NO_x. An Air Quality Monitoring Proposal will be prepared and submitted to AEPA upon receipt of the EPEA Approval, prior to Plant commissioning.

5.26 Air Emissions - Waste Stream Disposal

The Air Quality Dispersion Modelling Report is presented in Attachment Air Quality Dispersion Modelling Assessment(June 12th). As indicated in this report, the modelling predicts that all emissions associated with Normal Operations at the Plant will result in air quality concentrations that are in compliance with the applicable regulatory limits.

The Project is currently evaluating both conventional HRSG and OTSG steam generation technologies. Unless otherwise noted, references to steam generation equipment within this response apply to either configuration. The final technology selection will not alter the emissions performance commitments, SCR performance guarantees, or air quality modelling basis used for the Project.

6. Construction

6.1 Construction Schedule

The data center portion of the Project represents approximately 80-90% of the acreage while the power plant portion of the Project represents approximately 10-20%. Data center construction may start in advance of natural gas power plant construction as permitting is predominantly municipal and may be completed in advance of provincial environmental permitting.

<table>
<tr><th>Task / Milestone</th><th>Data Center 1</th><th>Data Center 2</th><th>Data Center 3-10</th></tr>
<tr><td>Ground Works and Foundation</td><td>March 2027</td><td>April 2027</td><td rowspan="5">Schedule as shown for each subsequent data center, one starts per month through to completion</td></tr>
<tr><td>Construction Shell</td><td>April 2027</td><td>May 2027</td></tr>
<tr><td>Interior Fit-up</td><td>May 2027</td><td>June 2027</td></tr>
<tr><td>Equipment Installation</td><td>June 2027</td><td>July 2027</td></tr>
<tr><td>Commissioning</td><td>July 2027</td><td>August 2027</td></tr>
<tr><td>Data Centers Operation Ready</td><td colspan="3">Pending NG Plant Completion</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Natural Gas Plant (Phase 1-Simple Cycle)</td><td>Permit Issuance + 6 month</td><td>Permit Issuance + 6 month</td><td>(1-2) 140 MW natural gas power plants/month thereafter until delivery schedule matches data center</td></tr>
<tr><td>Natural Gas Plant (Phase 2-HRSG)</td><td>Permit Issuance + 6 to 12 month</td><td>Permit Issuance + 6 to 12 month</td><td></td></tr>
</table>

Data Center
The data center construction portion of the schedule is expected to last a total of 18 months. Each of the 10 data centers will take 4 months to construct. Data center construction start time will occur in 1 month increments. It is expected that all permits required to begin construction of the data centers will be issued by February 2027.

Natural Gas Power Plant
The natural gas plant structure will be a prefabricated steel frame wrapped in metal insulated panels. Allowing for rapid onsite assembly. Power plant components are being factory acceptance tested and commissioned.

The power plant is designed to allow it to be brought online in two phases. Phase 1 will be the construction and commissioning of 2x50MW simple cycle turbines. Phase 2 will be the construction and commissioning of 40MW HRSG. Depending on construction timing commissioning of both may occur simultaneously.

6.2 Construction Site - Phases and Sensitive Areas

Phase 1 - Work Zone Prior to Potential Class D Wetland Relocation
An *Environmental Evaluation* has identified several potential ephemeral water bodies and temporary graminoid marshes onsite. These are intended to be relocated as part of the Project. While *Water Act* approval is underway, construction work will commence ensuring a minimum of 10m buffer setback from potential wetlands. Stripped top soil will be stored in the designated areas with 10m buffer setback from potential wetlands.

A workzone will be clearly marked onsite by an Environmental Inspector and is expected to be as shown in Figure 6.2.1. Groundwork is expected to start in the northwest corner of the workzone and transition to the southeast corner.

No sensitive soils or rare vegetation have been identified as shown in attachment - *Environmental Evaluation.*

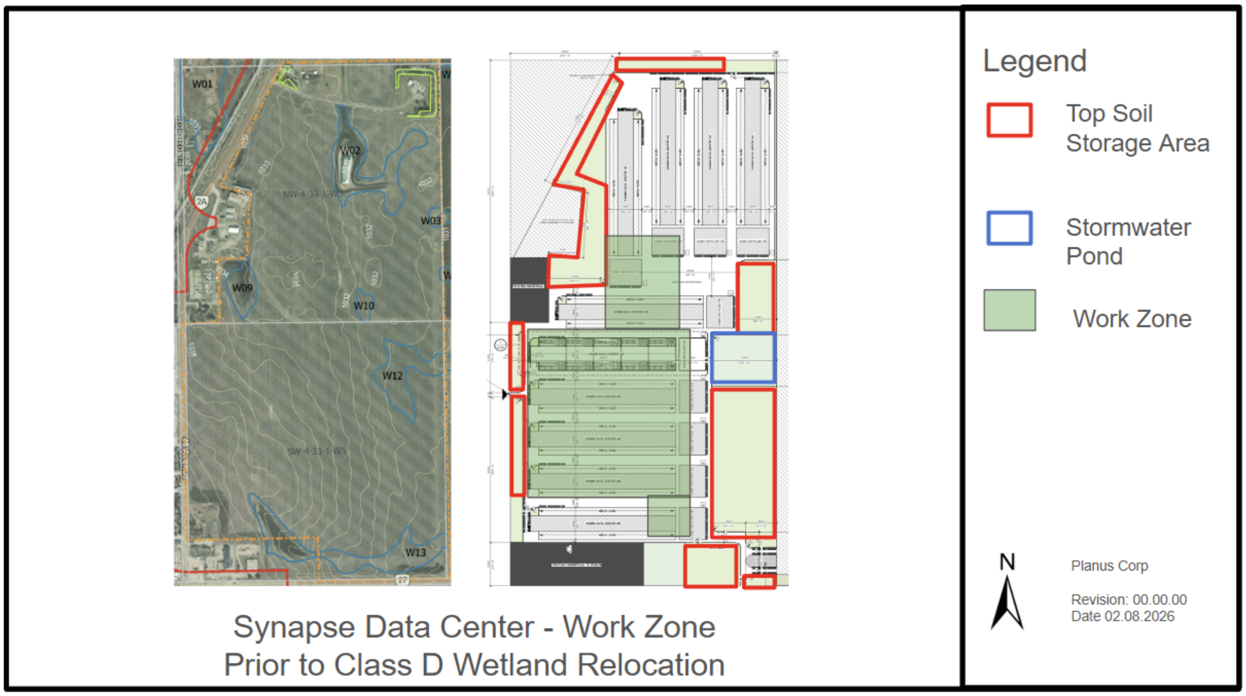

Figure 6.2.1 - Phase 1 Work Zone- Prior to Class D Wetland Relocation

Phase 2 - Work Zone Post to Class D Wetland Relocation
Following Water Act approval for relocation of any potential wetlands the work zone shall expand as identified below. In the event of Water Act approval prior to start of construction Phase 2 shall apply.

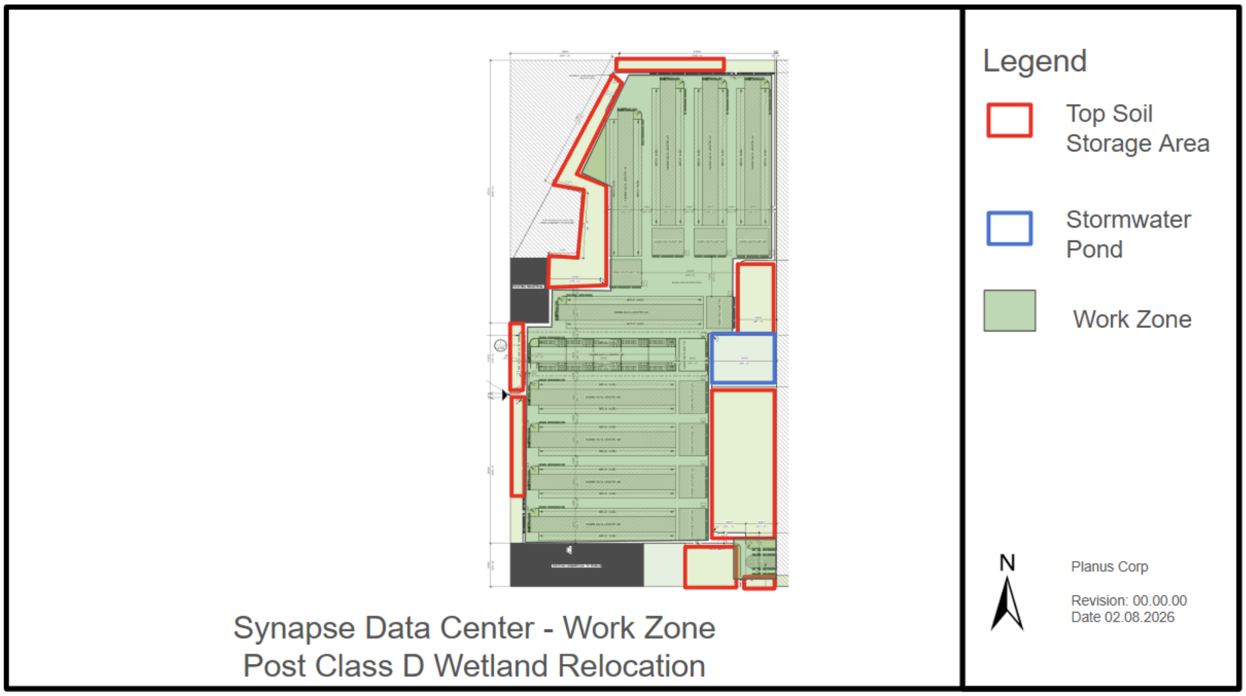

Figure 6.2.2 - Phase 2 Work Zone - Post Class D Wetland Relocation

6.3 Construction Activity Location and Storage

Data Center

A 80’ to 100’ laneway is located between each of the data center mechanical yards, providing sufficient access for construction around all sides of the data center during the construction period.

The mechanical yards beside each data center will be used for structural steel frame and metal insulated panel laydown and assembly. Once the steel frame structure is complete, the mechanical yards will be prepared for equipment installation. Just-in-time delivery will be applied with sufficient space for storage in unconstructed data center locations in case of early equipment arrival (see Figure 6.3.1).

As facility construction nears completion, a final equipment storage area has been established in Figure 6.3.2. This area is also suitable as a waste management/storage area for the site if it is determined that insufficient space exists in the data center laneways.

Power Plant

If data center construction occurs in parallel to the natural gas power plant. Space immediately surrounding each power plant will be available for construction staging and equipment storage. Additional storage space for short term power plant component storage is available in the laneways between data center mechanical yards if needed (see Figure 6.3.1).

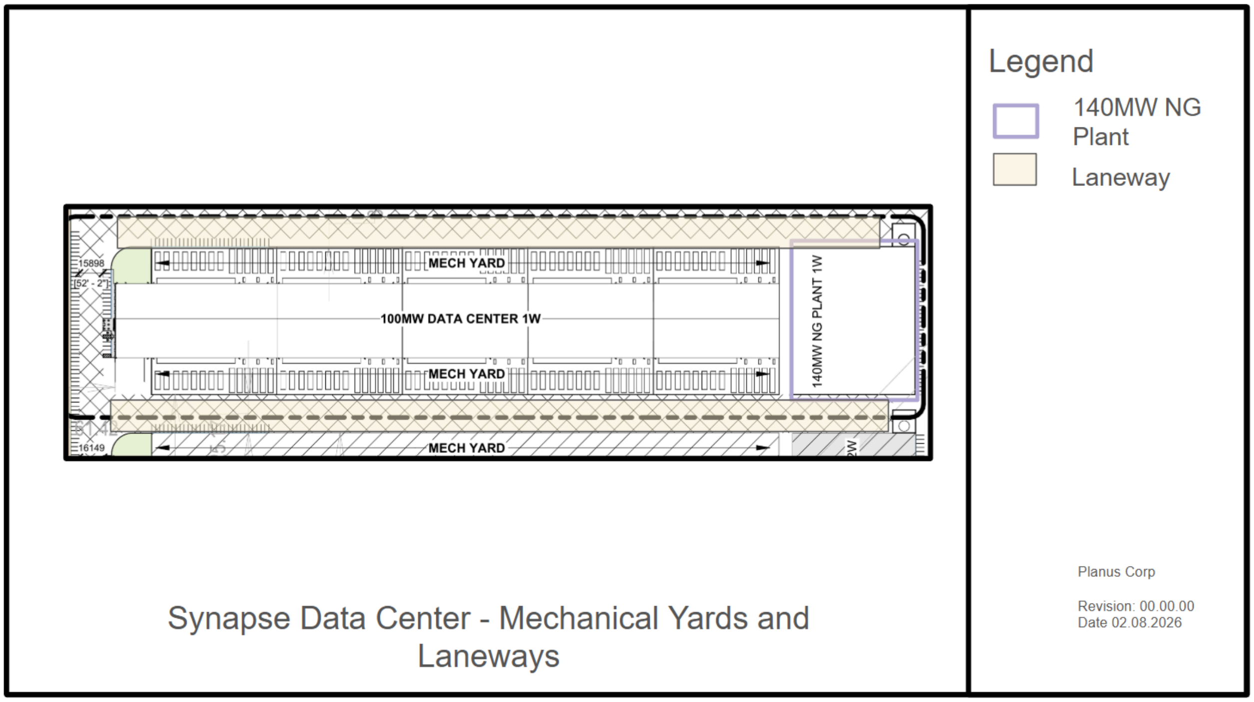

Figure 6.3.1 - Mechanical Yards and Laneways

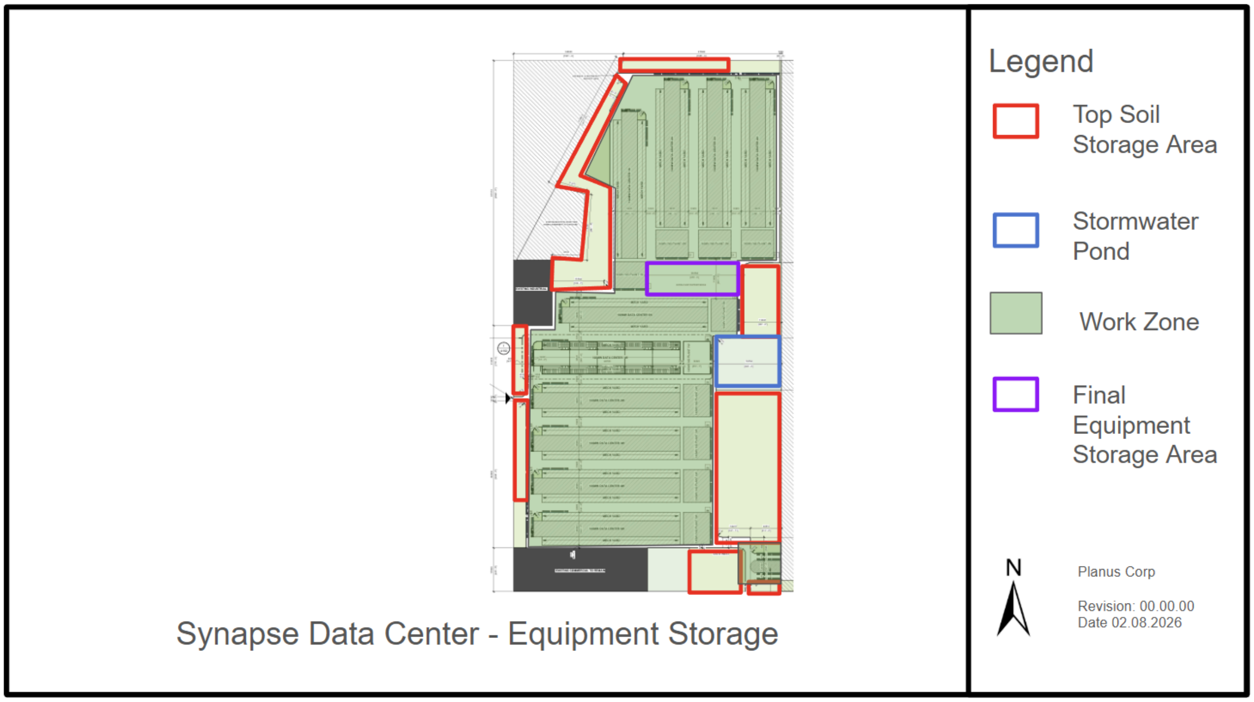

Figure 6.3.2 - Final Equipment Storage

6.4 Reclamation Material Salvaging

See attachment Environmental Evaluation - Section 3.1 for additional detail.

Soil Salvaging Equipment and Protocols

Appropriate excavation equipment will be used to maximize top soil recovery yield and minimize compaction. To protect soil quality, operational protocols include suspending salvage during adverse weather, implementing erosion controls on stockpiles, and disinfecting machinery to mitigate clubroot risks. Quality control is maintained through on-site environmental monitoring for legislative compliance, with permanent "as-built" soil records kept for future reference.

Topsoil Soil Depths and Quantity Soil Estimated for Salvage

14 boreholes (numbered 26-01 through 26-14) were drilled through the site with an average topsoil depth of 101.8mm and a range of 25 to 200mm. See Appendix B-1.

Procedures For Identifying and Addressing Soil Challenges

An environmental inspector will be engaged as required to ensure that topsoil and subsoil mixing does not occur.

Topsoil

See attachment Environmental Evaluation Section 3.1.3 for methodology to be deployed to mitigate adverse soil impact on site.

Record Keeping
As per industry standards, "as-built" details for all soil materials salvaged and redistributed, including stockpile locations and final placement depths, will be permanently kept on record to facilitate any future reclamation requirements, despite the facility's intended permanent nature.

6.5 Location and Methodology for Soil Storage

An estimated 740,000 m^2 of topsoil and soil will be disturbed for occupation by the data center, parking lot and natural gas power plants on site. Topsoil and soil shall be separated and stored for future reclamation in berms and designated areas marked in Figure 6.5.1.

These areas account for over 165,000 m^2 of suitable storage space. With a 1.5x safety multiple applied to average top soil depth, an average raised elevation of 0.7m is expected in order to store soil in these four areas.

See attachment Environmental Evaluation section 3.1.3 for methods to be applied for erosion control and soil separation.

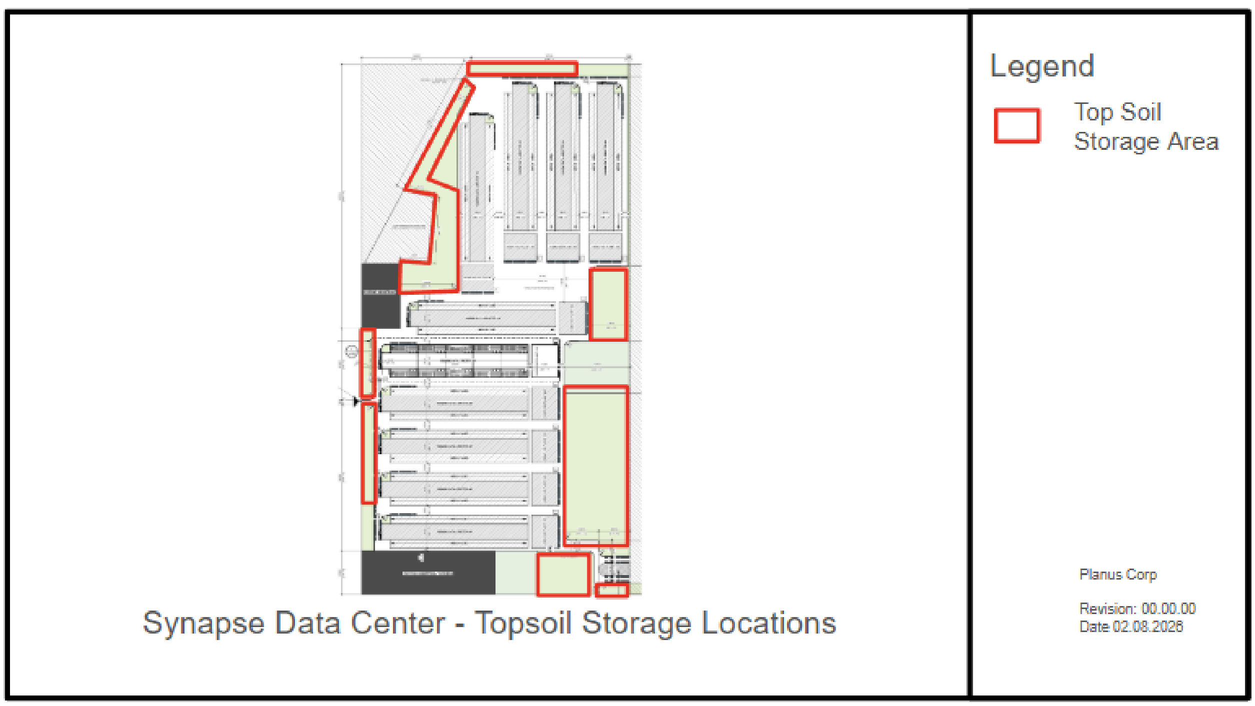

Figure 6.5.1 - Topsoil and Soil Storage Area

6.6 Timber Salvaging

The large majority of trees on site will be preserved in natural berms. <30% of trees onsite will be relocated into sections of berms where there are no existing trees.

6.7 Construction on Contaminated Land

Ground water and soil analysis taken as part of the *Environmental Evaluation* shows no contamination present. This is consistent with the view that the land has been used exclusively as farmed agricultural land.

The adjacent county/municipal road yard has known contamination present due to road salt handling and use. The soil immediately surrounding the road yard is intended to remain undisturbed. Soil samples will be taken prior to soil disturbance on the west side of the data center and natural gas power plant (1N) and north west side of 5N. See Figure 6.7.1.

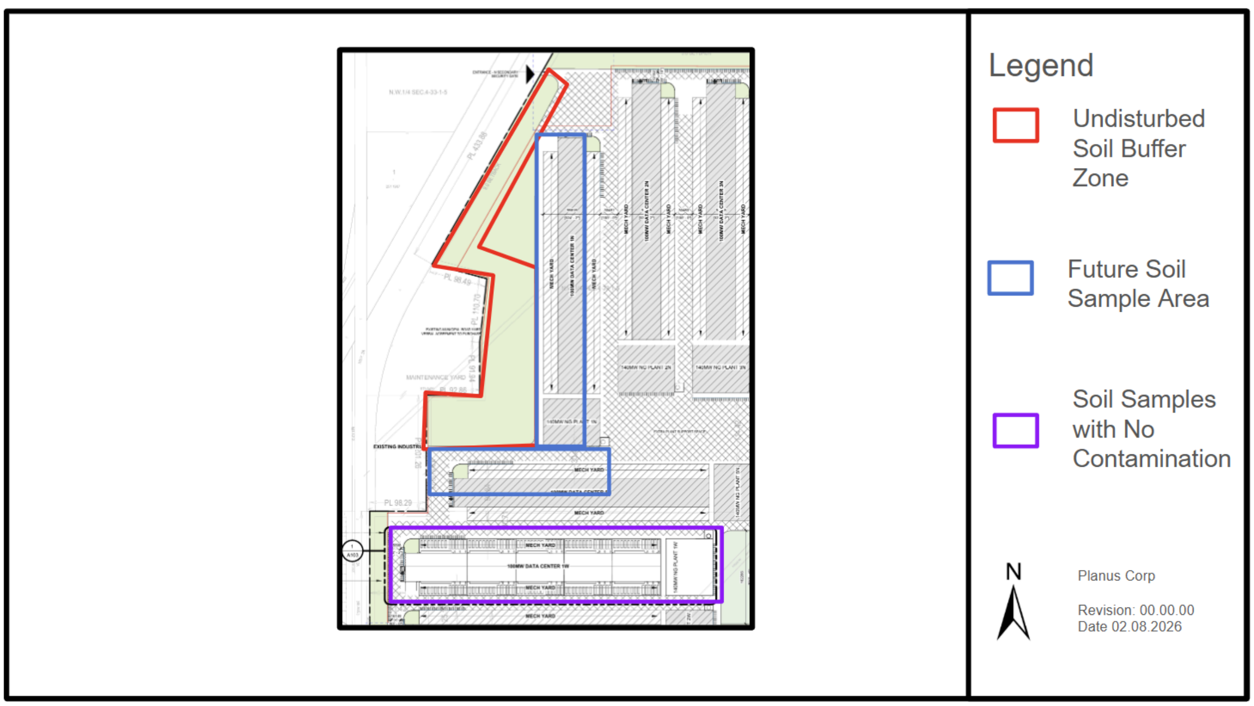

Figure 6.7.1 - Soil Testing and Future Soil Testing Regions

6.8 Contamination Avoidance and Management

Contamination of soil, groundwater, surface water, and air during construction will be managed through containment, monitoring, and waste management protocols aligned with the environmental protection approaches in Section 5.

- **Temporary Waste Sites:** Handling, recycling, and storage areas will be located away from sensitive environmental receptors, such as via 10m wetland buffers.
    - **Berms, Liners, and Secondary Containment:** Hazardous wastes (chemicals/lubricants) will be kept in dedicated enclosures with secure cabinets and bins. All fuel and liquid storage tanks, including waste oil, will utilize secondary containment systems. Equipment storage areas will feature concrete curbing for additional containment.
    - **Runoff Collection and Treatment:** An Erosion and Sediment Control (ESC) plan includes a lined stormwater reservoir sized for a 1:100-year rain event. The system includes oil separation and continuous monitoring; water found to be contaminated will be removed by vacuum truck for off-site treatment. Topsoil and subsoil will be stored in designated berms to prevent sedimentation.
    - **Leak Detection:** Fuel storage systems and generator belly tanks will use continuous vacuum-sealed leak detection. Above-ground tanks for liquid discharge will feature anti-corrosion coatings or cathodic protection.
    - **Fugitive Emissions and Dust:** To meet Alberta Ambient Air Quality Objectives (AAAQO), fugitive dust will be managed by watering unpaved roads and active work areas. Construction equipment will be maintained to minimize combustion emissions, and activities near identified Areas of Potential Environmental Concern (APECs) will be managed to prevent the release of legacy contaminants.

6.9 Releases During the Construction Phase

Releases are primarily limited to air emissions from construction equipment and dust, particularly during the ground works phase.

- Substances of Concern and Mitigation:
    - **Dust Control:** Includes routine water application via trucks, a strict 20 km/h site speed limit, and silt fencing or hydroseeding for stockpiles. All trucks hauling dry materials must be tarped, and "shaker plates" or gravel pads will be installed at exits to prevent mud track-out.
    - **Equipment Emissions:** Heavy-duty equipment manufactured after 2014 must meet Tier 4 Final standards (using SCR and DPF). A strict 5-minute anti-idling policy will be enforced, except in extreme cold (below -15°C).
- **Volumes and Rates:** The mitigation strategy is designed to manage a 2,000-person construction fleet.
- **Performance Monitoring:** Equipment showing "excessive smoke" will be removed from service until repaired.

6.10 Environmental Release Monitoring

- **Dust Monitoring:** Daily visual inspections will be conducted by the Environmental Manager. Instrumental monitoring will involve two continuous particulate monitors (e.g., DustTrak) located at the downwind property boundary during peak earthworks.
- Action Levels:
  - **Level 1 (Caution):** Triggered at 50% of AAAQO limits; requires increased watering.
  - **Level 2 (Stop Work):** Triggered at 90% of AAAQO limits or sustained winds over 50 km/h; requires ceasing high-dust activities.
- **Emissions Monitoring:** Site supervisors will perform daily walk-arounds to identify leaking exhausts or poorly tuned engines. GPS and telematics will track fleet idle times, and non-compliant equipment will be tagged "Out of Service".

6.11 Location of Ambient Monitoring Equipment

Particulate monitors will be deployed at the downwind property boundary during peak earthworks.

7. Operation

7.1 Record Keeping Procedures

To maintain compliance with Alberta Environment and Protected Areas (AEPA) , the Project must implement a formal procedure for managing documentation. All applications, technical studies, and regulatory correspondence must be captured in a centralized Regulatory Master File (RMF) and retained for a legally mandated minimum of 10 years. This process ensures audit readiness by creating a "Mirror File" of all interactions, starting from the pre-application phase through the issuance of the final Operating Approval.

Operational integrity requires storing documents in a standardized electronic hierarchy using searchable PDFs and strict naming conventions (e.g., [Approval#]_[Date]_[Description]). All submissions via OneStop or ETS must include a digital "Submission Receipt." Furthermore, a Correspondence Tracking Log must be updated within 24 hours of any regulatory interaction, specifically archiving Supplemental Information Requests (SIRs) and formal responses. Any "commitments" made during these exchanges must be extracted into a tracking table to ensure operational compliance once the plant is commissioned.

Finally, the procedure mandates strict protocols for sensitive data and long-term oversight. Information deemed proprietary under Section 35 of the EPEA must be filed separately with the Director’s written approval. To ensure accuracy, the Regulatory Lead should perform an annual "Mirror Audit" against the regulator’s public record.

7.2 Operating Procedure for Release Monitoring and Performance

To ensure the integrity of environmental data for new natural gas facilities, Synapse Real Estate Corp. will implement a Quality Management System (QMS) aligned with the Air Monitoring Directive (AMD) and EPEA standards. Under Section 5.24, CEMS are maintained via a tiered process: automated daily calibrations to detect drift, quarterly Cylinder Gas Audits (CGA) using certified gases, and an annual Relative Accuracy Test Audit (RATA) conducted by third parties to verify system precision within the +/-10% regulatory threshold.

Wastewater discharge procedures under Section 5.12 focus on precise sampling integrity. A remote optical watcher (ROW) will be used to identify any pond water contamination. Monthly target tests and optical cleaning shall be performed.

An Annual Quality Audit performed by the Environmental Manager will be performed to ensure maintenance records align with reported data and to identify subtle instrument drift early to prevent regulatory non-compliance.

7.3 Jointly Delivered Monitoring

Not planned to be jointly delivered at this time.

7.4 Air Quality Monitoring Network And Procedures

The ambient air monitoring strategy for the Synapse Real Estate Corp natural gas power plant will focus on source-specific monitoring and advanced dispersion modelling to ensure local air quality remains within regulatory limits. A Continuous Emissions Monitoring System (CEMS) will be used to monitor NO_x, temperature and effluent flow-rate at a minimum, directly from the main turbine exhaust stacks. This system is designed to meet the reporting requirements of the *New Source Emission Guidelines for Thermal Generation* (ECCC 2010) and provides the real-time data necessary to control unit operations and maintain efficiency.

The monitoring system will undergo quarterly Cylinder Gas Audits (CGA). This involves challenging the analyzers with known gas concentrations to verify linearity and accuracy.

A project-specific passive monitoring network will be established at sensitive receptor locations identified in the modeling to have the highest predicted ground-level concentrations. These areas include the north-east corner of Olds College,the north-east property boundary, and residential units south-west. Synapse proposes to monitor NO_x and Total Dustfall using this passive monitoring network.

7.5 Watercourse Monitoring And Procedures

To meet environmental requirements, a Rain Rescue Oil-Water Separator will be installed in the stormwater system, acting as a critical barrier by effectively filtering out oil and sediment to improve stormwater quality before it enters natural water bodies.

Monitoring will sample the inlet and water discharge locations should utilize real-time UV-fluorescence sensors for hydrocarbons and turbidity probes for sediment, supplemented by quarterly grab samples for Total Petroleum Hydrocarbons (TPH) and Total Suspended Solids (TSS). This dual-layer methodology provides immediate contamination alerts while ensuring long-term compliance with environmental standards.

Sediment and biologic monitoring are essential to assess the long-term effectiveness of the separator's grit-trapping capabilities. The sediment quality will be analyzed bi-annually within the unit, alongside annual biological assessments of the receiving watercourse to ensure that overflow from storms exceeding the 1:100 year design does not degrade the environment.

Monitoring locations are strategically selected at the inlet to establish baseline pollutant loads and at the discharge point to measure the efficiency of the separation process. Operational procedure will be put in place to reduce risk of a spill event in advance of a 1:100 year storm event.

7.6 Wastewater

Domestic sewage will be sent to the town of Olds through the sanitation system for treatment.

Any minimal plant wastewater will be contained as described in section 5.6 and sent offsite for treatment.

7.7 Emissions and Wastewater Record Keeping Procedures

All Continuous Emission Monitoring (CEMS) records—including daily calibrations, quarterly Cylinder Gas Audits, and annual RATA results—will be digitally logged with verifiable submission receipts. Wastewater and liquid discharge logs must document the annual professional calibration of electromagnetic flow meters and monthly cleaning of composite samplers. All laboratory analysis results from accredited facilities will be stored as searchable PDFs in the Regulatory Master File (RMF), accompanied by full Chain of Custody documentation and logs of any equipment downtime or "Return to Service" validations to ensure data integrity over a 10-year retention period.

For air and stormwater monitoring under Section 7.5, data from real-time sensors, such as UV-fluorescence hydrocarbon and turbidity probes, will be integrated into the centralized electronic hierarchy and made searchable by date and parameter. Results from quarterly grab samples and bi-annual sediment quality analyses will follow the standardized naming convention (e.g., [Approval#]_[Date]_[Description]) for filing in the RMF. Additionally, annual biological assessment reports of receiving watercourses must be archived as technical studies to support long-term environmental oversight and historical data comparisons.

To maintain overall system accountability, operational logs must specifically document risk-reduction procedures performed in advance of 1:100 year storm events, as recorded in the Correspondence Tracking Log. All monitoring data for both sections must be included in an annual "Mirror Audit" against public records to verify accuracy against

Alberta Environment and Protected Areas (AEPA) standards. This structured approach ensures that all environmental monitoring data is consistent, retrievable, and fully compliant with the facility's Quality Management System.

7.8 Emissions and Wastewater Reporting Procedures

In the event of a violation of approved permitting thresholds, the facility must initiate a standardized notification process to communicate directly with the designated regulator or Ministry contact. All incidents must be recorded in a dedicated incident log and immediately escalated to the Chief Security Officer or relevant Ministry Representative to ensure compliance integrity. Depending on the severity of the breach, formal notification with regular updates will be provided to the authorities until the situation is fully resolved and the incident is officially closed by management.

To maintain audit readiness and long-term accountability, all documentation regarding the violation, including the raw monitoring data, communication logs, and the specific "Return to Service" validations, must be stored within the Regulatory Master File. Following the initial report, the facility is required to present a formal mitigation plan to the regulators detailing how the failure will be rectified and how procedures will be modified to prevent future occurrences. These records are then subject to annual "Mirror Audits" against public records to verify that the facility's reporting remains accurate and fully compliant with Alberta Environment and Protected Areas (AEPA) standards.

7.9 Spill Response and Reporting Plan

A spill response and reporting plan will be developed prior to commencement of operations of the facility.

7.10 Procedures Storage, Treatment & Monitoring Systems

Procedures and plans for storage, treatment, and monitoring systems related to wastewater, runoff, and sludge will be developed prior to commencement of operations of the facility.

7.11 Air Emission Control Maintenance and Repair

Scheduled air emission control equipment maintenance surveillance and repair plans will be developed prior to commencement of operations of the facility.

7.12 Groundwater Monitoring Program

A groundwater monitoring program will be proposed and implemented at the Facility to comply with EPEA requirements. Once the Facility is operational, the groundwater monitoring program proposal will be prepared and will include specific monitoring and background locations, chemical and physical parameters to be tested or inspected, applicable guidelines, reporting components and frequency of the program.

7.14 Additional Monitoring Programs

Any equipment operating with non gaseous lubricants will be monitored for spills.

7.15 Acceptance of Third Party Waste

The facility will not accept third party waste.

7.16 Methods for Waste Classification

Confirmed. The applicable methods for classifying and characterizing waste will be used.

7.17 Top Soil Storage Management

Soil shall be stored in dedicated stockpiles predominantly not exceeding 2 meters in height to maintain aerobic conditions and prevent the "smothering" of beneficial microbes. These stockpiles must be situated away from heavy machinery traffic and drainage lines, and clearly demarcated with "No-Go" fencing to prevent unauthorized compaction from site vehicles.

To ensure long-term viability and prevent environmental degradation, all stockpiles remaining for more than 30 days must be stabilized using a fast-growing, non-invasive cover crop or an approved erosion control matting. This vegetation serves to anchor the soil against wind and water erosion while maintaining a healthy underground ecosystem for future replanting. Perimeter silt fencing will be installed at the base of all piles to capture sediment runoff and protect local water quality. Throughout the storage period, the site manager is responsible for monitoring and removing invasive weeds to ensure that the soil remains "clean" and fertile for its final application during the site’s restoration phase. Slope should be maintained at 1:2 or less.

7.18 Operator Certification and Qualifications

The Project is designed as a high-capacity thermal power generation facility, utilizing advanced combined-cycle technology with a total site power capacity of 1,400 MW. Consequently, the site is classified as a 1st Class Power Plant under the provincial Power Engineers Regulation, administered by the Alberta Boilers Safety Association (ABSA).

7.7.1 ABSA Power Engineering Requirements

In accordance with the Safety Codes Act (“the Act”) and associated regulations, the facility will be staffed by certified Power Engineers, in the position of Steam Plant

Operators, and must hold valid certificates of competency in the province of Alberta. The following positions are of key importance for compliance with the Act:

- **Chief Power Engineer:** The facility will employ a 1st Class Power Engineer as the Chief Power Engineer. This individual is responsible for the safe operation and maintenance of all pressure equipment on site, including but not limited to the steam generation equipment(HRSGs or OTSGs), Steam Turbines, Pressure Safety Valves (PSVs), and all other pressurized equipment and piping.
- **Shift Supervisors:** Continuous 24/7 operation will be overseen by Shift Engineers holding the appropriate class of certification required for the plant's total registered kilowatt (kW) rating.
- **Operations Personnel:** All personnel responsible for the direct control of steam-cycle equipment will be ticked operators as required by ABSA.

7.7.2 Specialized Environmental and Safety Training

Beyond statutory power engineering requirements, operators will receive specialized training to manage the specific environmental control systems identified in Section 5, including but not limited to:

- **SCR and Reagent Management:** Training in the handling of 19% aqueous ammonia, and the automated control of Selective Catalytic Reduction (SCR) systems to ensure NO_x compliance, while minimizing ammonia slip.
- **Water Recovery System (WRS):** Technical understanding and proficiency in the operation of the zero-liquids discharge infrastructure, including Reverse Osmosis (RO) units, water quality monitoring and testing, and chemical dosing strategies specific to the facilities specific water quality management program.
- **Flare-less Relief System:** Training on the Safety Instrument System (SIS) and Burner Management System (BMS) logic used to route fuel gas system pressure relief valves to duct burners for safe, treated combustion rather than flaring.

7.7.3 Quality and Integrity Management Systems

The facility will operate under a certified Quality Management System (QMS) and a Pressure Equipment Integrity Management (PEIM) program approved by ABSA. All maintenance repair activities on regulated equipment will be performed by contractors with valid ABSA Quality Program certificates.

8. Reclamation

8.1 End land-use

The land is zoned industrial and directly adjacent to the town of Olds. It was included in the town of Olds 2024 ASP when it was annexed into the town from the county.

The data center buildings occupying 80-90% of the site have an industrial warehouse design with a 100+ year life expectancy. The natural gas power plant, occupying 10-20% of the site, has a life expectancy of 25 years. It is expected that the natural gas power plant will undergo continued upgrades such that its life expectancy matches that of the data center. The expected end land use of the site is industrial.

See Environmental Evaluation performed for impact to wildlife.

In the event that the site is scheduled for reclamation, a detailed Conservation and Reclamation (C&R) Plan will be submitted to AEPA for approval with the requisite detailed plans. Details will be provided on the removal of infrastructure and Plant site contouring, if required. Revegetation, land management and wildlife habitat plans will be considered.

8.2 Reclamation of Landform Drainage and Watercourse

See Section 8.1.

8.3 Replacing soil

Topsoil is being stored on site and protected from long term erosion by integration into the site's natural landscaping. A Soils Reclamation Plan will be developed to address these issues prior to the site being reclaimed.

8.4 Re-vegetation

A Revegetation and Vegetation Monitoring Plan will be developed to address this issue prior to the site being reclaimed. Information presented in attachment Environmental Evaluation will be used for this purpose.

8.5 Wastewater Run Off

See Section 8.1

8.6 Wastes Generated

All wastes will be handled in accordance with applicable regulations at the time of reclamation. The equipment will be scrapped or transferred to another facility for continued use or will be sold. A demolition contractor will be contracted to salvage the materials in the decommissioned units and to accept responsibility for the proper disposal of all building and infrastructure materials. The removal and disposal of hazardous materials, if any, will be performed by a certified contractor. Salvageable materials will be removed from the site and recycled. Non-salvageable materials will be transferred to an appropriate landfill. Land reclamation planning will be evaluated at a future time.

8.7 Dusts, odours and contamination control

Dust will be controlled using water spraying, if necessary. Noise will be limited to normal working hours.

8.8 Vapour Control

Vapours, if any, will be handled using standard industry practices at the time of reclamation.

8.9 Existing and Planned Infrastructure for Environmental Monitoring

Monitoring plans, if required, will be developed prior to reclamation.

8.10 Stakeholder Involvement

Public consultation will be performed in accordance with AEPA requirements at the time.

8.11 Contact Information

A Public Consultation Plan will be developed at the time of reclamation, if required.

8.12 Engineered Water Course

Not applicable.

8.13 Effects on Watercourses

Not applicable.

8.14 Progressive Reclamation Plan

Not applicable at this time.

8.15 Reclamation Timelines

The expected end land use of the site is industrial.

8.16 Reduction of Cumulative Impact of Reclamation

If progressive reclamation is eventually required at the Plant, the reclamation will be handled according to the standard industry practices at the time and would be completed by a certified contractor. This contractor, in all likelihood, would be responsible for material salvage, recycling and disposal. The methodology, extent and timing of such a dismantling process will be developed.

8.17 Reclamation Materials Handling

Reclamation materials will be stored in accordance with applicable regulations and industry standards at the time of reclamation.

8.18 Reclamation Materials Storage

See Section 8.17.

8.19 Address 8.1 to 8.13 for progressive reclamation

See Section 8.1.

9. REFERENCES

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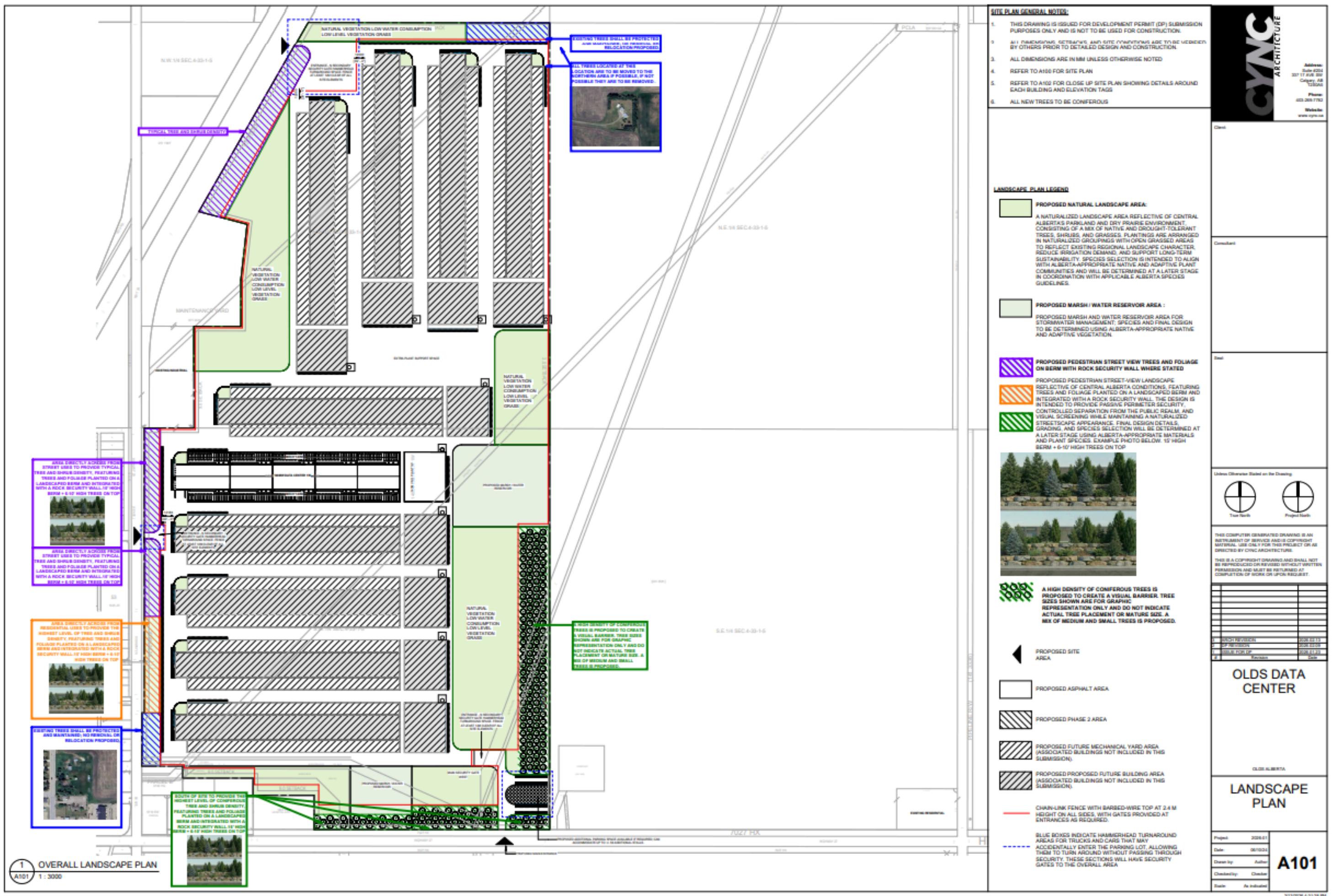
Appendix

A-1 - Development Permit - Landscaping Plan



B-1 - Bore Holes

Borehole No.	Topsoil Depth
26-01	100 mm
26-02	100 mm
26-03	100 mm
26-04	25 mm
26-05	100 mm
26-06	100 mm
26-07	100 mm
26-08	100 mm
26-09	100 mm
26-10	100 mm
26-11	200 mm
26-12	100 mm
26-13	100 mm
26-14	100 mm

C-1 - Storage Table

Tank ID	Description	Location	Contents	Size	Placement	Material of Primary Container	Corrosion Control	Secondary Containment	Method of Leak Detection	Maximum True Vapour Pressure	Type of Vents	Fugitive Emissions Controls (VR)
T-A-100 to T-A-110	NH_3 Day Tank (1 per plant)	Adjacent to each SCR, per power plant (Outdoors)	Aqueous Ammonia wt 19%	d =1.2 m h = 1.77 m V = 2 m^3	Aboveground vertical tank on concrete pad	316L SS	Material compatibility & selection	Double-wall tank with curbed containment area	Interstitial monitoring of double-wall annulus. Hi/ Hi-Hi alarm and Lo/ Lo-Lo alarm to DCS. Berm Hi-alarm to DCS.	62.1 kPa(a) at 37.8 C for 19% aqueous ammonia	Atmospheric venting through vent treatment (packed scrubber)	Closed fill / transfer connections. PV vent routed to ammonia treatment. Routine inspections. NH_3 area detection alarms.
T-A-BS-100/102	NH_3 Bulk Storage Tank (2 site wide)	Adjacent to truck offloading containment pad (Outdoors)	Aqueous Ammonia wt 19%	d = 4 m h = 7.2 m V = 90 m^3	Aboveground vertical tank on concrete pad	316 L SS	Material compatibility & selection	Double-wall tank with curbed containment area	Interstitial monitoring of double-wall annulus. Hi/ Hi-Hi alarm and Lo/ Lo-Lo alarm to DCS. Berm Hi-alarm to DCS	62.1 kPa(a) at 37.8 C for 19% aqueous ammonia	Atmospheric venting through vent treatment (packed scrubber)	Closed fill / transfer connections. PV vent routed to ammonia treatment. Routine inspections. NH_3 area detection alarms.
T-G-100 to TG-110	Glycol Expansion and Storage Tank (1 per plant)	Adjacent to the circulating pimps and side stream filtration package (Indoors)	50/50 glycol-water mixture	d = 2.5 m h = 2.0 m V = 10m^3	Aboveground vertical tank on engineered concrete pad	Carbon Steel with internal coating	Internal coating / lining. Corrosion-inhibited glycol formulation	Engineered berm and lined containment cell.	Tank level monitoring with Hi / Hi-Hi (overfill) and Lo / Lo-Lo alarms to DCS. Containment sump Hi-alarm to DCS.	Negligible under all ambient conditions	Atmospheric venting routed to safe location (berm sump)	Not applicable.
T-CDO-100 to T-CDO-110	BFW Chemical Storage Totes (1 per plant)	Adjacent to BFW chemical injection skid (Indoors)	Dissolved Oxygen Scavenger	w = 1 m h = 1 m V = 1 m^3	Within individual bermed containment cells	HDPE IBC tote in steel cage	Material compatibility & selection (supplier SDS)	Lined secondary containment.	Visual inspection. Low-level injection at injection skid.	Not Applicable	Atmospheric vent	Closed transfer connections to injection skid. No vapour recovery required.
T-CCI-100 to T-CCI-110	BFW Chemical Storage Totes (1 per plant)	Adjacent to BFW chemical injection skid (Indoors)	Corrosion Inhibitor	w = 1 m h = 1 m V = 1 m^3	Within individual bermed containment cells	HDPE IBC tote in steel cage	Material compatibility & selection (supplier SDS)	Lined secondary containment.	Visual inspection. Low-level injection at injection skid.	Not Applicable	Atmospheric vent	Closed transfer connections to injection skid. No vapour recovery required.
T-CAS-100 to T-CAS-110	BFW Chemical Storage Totes (1 per plant)	Adjacent to BFW chemical injection skid (Indoors)	Anti-Scalant	w = 1 m h = 1 m V = 1 m^3	Within individual bermed containment cells	HDPE IBC tote in steel cage	Material compatibility & selection (supplier SDS)	Lined secondary containment.	Visual inspection. Low-level injection at injection skid.	Not Applicable	Atmospheric vent	Closed transfer connections to injection skid. No vapour recovery required.
T-CPH-100 to T-CPH-110	BFW Chemical Storage Totes (1 per plant)	Adjacent to BFW chemical injection skid (Indoors)	pH Control (caustic or amine)	w = 1 m h = 1 m V = 1 m^3	Within individual bermed containment cells	HDPE IBC tote in steel cage	Material compatibility & selection (supplier SDS)	Lined secondary containment.	Visual inspection. Low-level injection at injection skid.	Not Applicable	Atmospheric vent	Closed transfer connections to injection skid. No vapour recovery required.

T-TWS-001	Treated Water Storage (1 site wide)	North-Central Utility Area (Outdoors)	Demineralized Deoxygenated Boiler Feed Water Make-Up Supply	d = 7.62 m h = 8 m V =350 m^3	Aboveground vertical tank on engineered concrete pa	304L SS, insulated and heat traced for freeze protection	Material compatibility & selection	Curbed concrete containment.	Level transmitter (continuous), Hi-level and Lo-Level alarms to DCS.	Not Applicable	Atmospheric Vent	Not Applicable.
V-BFW-001	Condensate Collection / Storage Tank (1 per plant)	Adjacent to Glycol Expansion / Storage Tank (Inside)	Condensate (demineralized water) post polishing as BFW	d = 3 m l = 10 m T/T V = 70 m^3	ASME pressure vessel on engineered supports	Carbon Steel	Condensate Chemistry Control & Deoxygenation strategy	Building footings & foundation	Level transmitter (continuous), Hi-level and Lo-Level alarms to DCS. Code Required PSV.	300 kPa	Pressurized System	Closed System. Vent/Relief to safe location (floor drain)
40-T-001 to 40-T-600	Diesel Storage Tank (1 per emergency generator)	Mechanical Yards (Outdoors)	Diesel Fuel	l=10 m w=3.9 m h=0,5 m V=17m3 **OR** l=10 m w=3.9 m h=1.1m V=34m3	Self-contained under the diesel generators as a “Belly Tank”	ASTM A36 Carbon Steel	Material compatibility & selection (coated)	Double-wall tank with exterior coating	Vacuum pressure failure indication, HI-level alarm in interstitial space	0.4 kPa @ 37.8 C	10 kPa PVRV relief to exhaust duct. Fire case PSV required	N/A - Diesel fuel storage; low vapour pressure fuel. Double-wall UL 142 belly tank with atmospheric venting and leak detection
40-DT-001 to 40-DT-100	DEF Storage Tank (1 per group of 6 emergency generators)	Mechanical Yards (Outdoors)	Diesel Exhaust Fluid (DEF)	d=2 m h=1.9 m V=6 m3	Adjacent to each group of diesel generators	DEF compatible HDPE, polyethylene, or 316 Stainless Steel. Final tank material to be confirmed by vendor	Material compatibility and selection	Double-wall integral secondary containment - same material as primary tank or vendor approved DEF-compatible containment material.	Interstitial liquid level switch with local / DCS alarms	0.08 kPa @ 20 C	Overflow P-Trap to curb, 10 kPa PVRV relief to atmosphere	N/A - Low volatility liquid; double-wall atmospheric storage with closed fill connections and interstitial leak detection

D-1 - Plant Diagrams

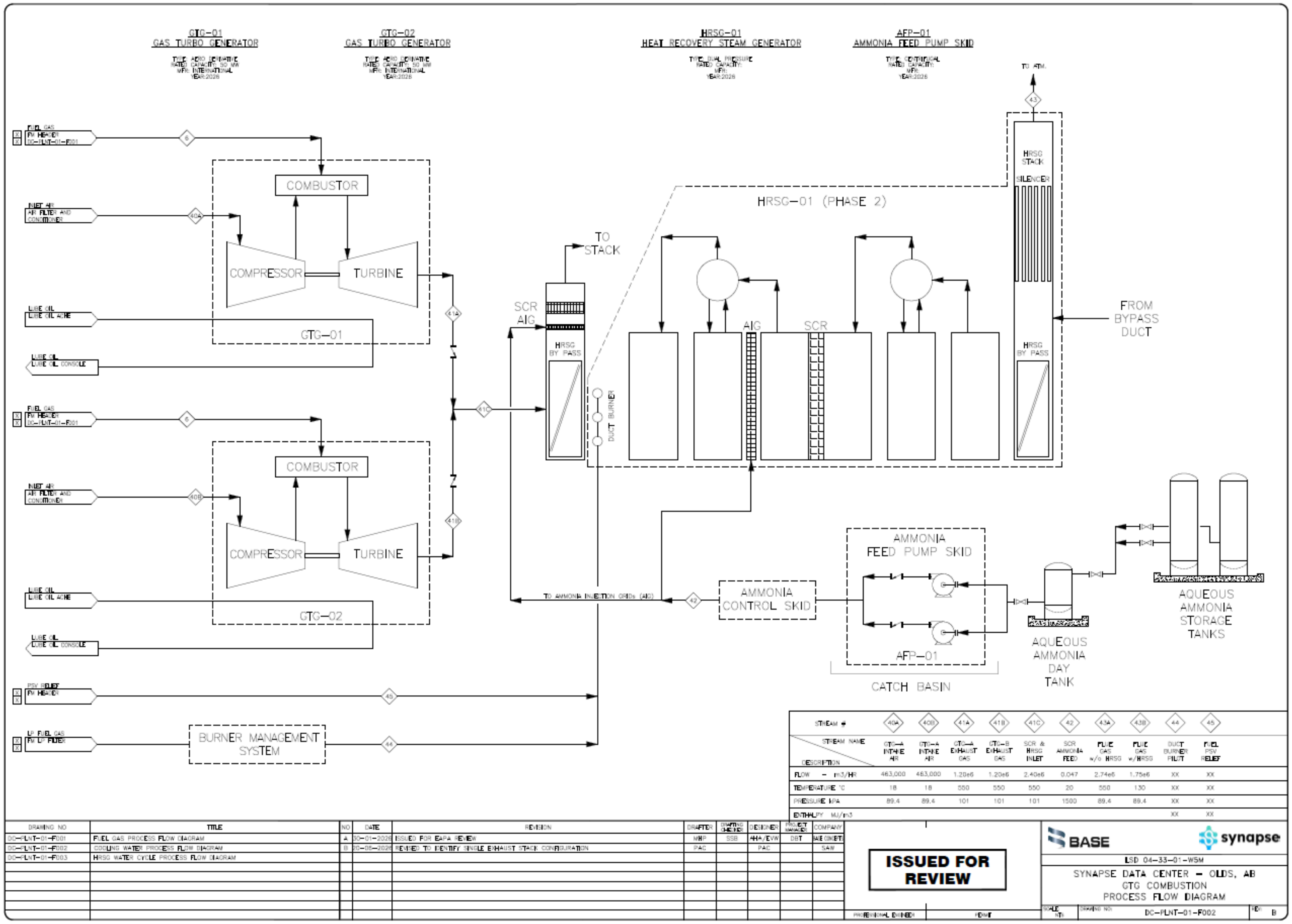
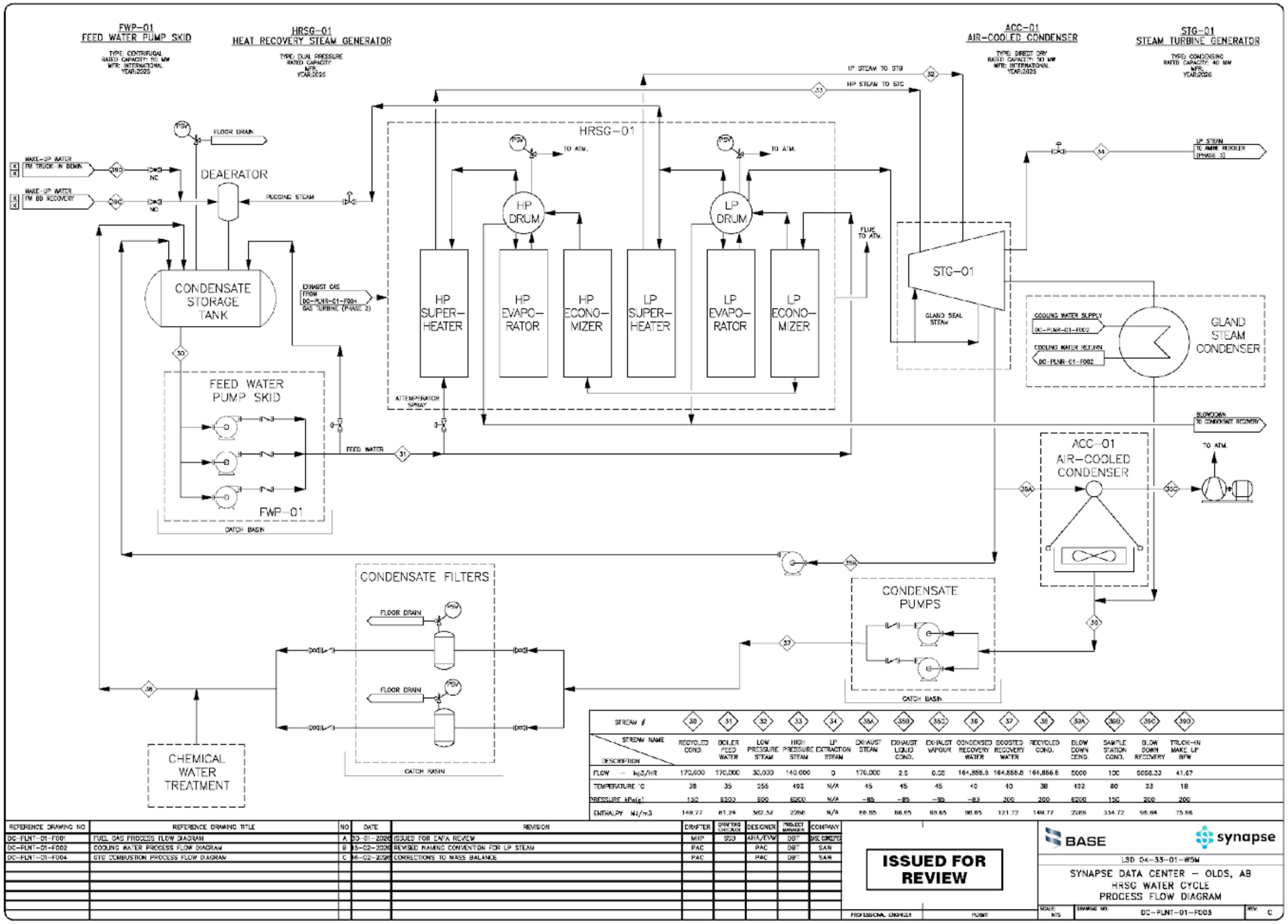


Figure D-1.1- Gas Combustion Process Flow Diagram



STREAM #	30	31	32	33	34	35A	35B	35C	36	37	38	39A	39B	39C	39D
STREAM NAME / DESCRIPTION	RECYCLED COND.	BOILER FEED WATER	LOW PRESSURE STEAM	HIGH PRESSURE STEAM	LP EXTRACTION STEAM	EXHAUST STEAM	EXHAUST LIQUID COND.	EXHAUST VAPOUR	CONDENSED RECOVERY WATER	BOOSTED RECOVERY WATER	RECYCLED COND.	BLOW DOWN COND.	SAMPLE STATION COND.	BLOW DOWN RECOVERY	TRUCK-IN MAKE UP BFW
FLOW – kg3/HR	170,000	170,000	30,000	140,000	0	170,000	2.5	0.05	164,866.5	164,866.5	164,866.5	5000	100	5058.33	41.67
TEMPERATURE °C	38	35	255	492	N/A	45	45	45	40	40	38	492	80	23	18
PRESSURE kPa(g)	150	6200	600	6200	N/A	-85	-85	-85	-83	300	200	6200	150	200	200
ENTHALPY MJ/m3	149.77	81.24	582.32	2288	N/A	66.65	66.65	66.65	98.65	121.72	149.77	2288	334.72	96.84	75.66

REFERENCE DRAWING NO	REFERENCE DRAWING TITLE	NO	DATE	REVISION	DRAFTER	DRAFTING CHECKER	DESIGNER	PROJECT MANAGER	COMPANY
DC-FLNT-01-F001	FUEL GAS PROCESS FLOW DIAGRAM	A	30-01-2026	ISSUED FOR EAPA REVIEW	MHP	SSB	AHA/EVW	DBT	BASE CONCEPTS
DC-FLNT-01-F002	COOLING WATER PROCESS FLOW DIAGRAM	B	15-02-2026	REVISED NAMING CONVENTION FOR LP STEAM	PAC		PAC	DBT	SAW
DC-FLNT-01-F004	GTG COMBUSTION PROCESS FLOW DIAGRAM	C	16-02-2026	CORRECTIONS TO MASS BALANCE	PAC		PAC	DBT	SAW

Figure D-1.2- HRSG Water Cycle Process Flow Diagram

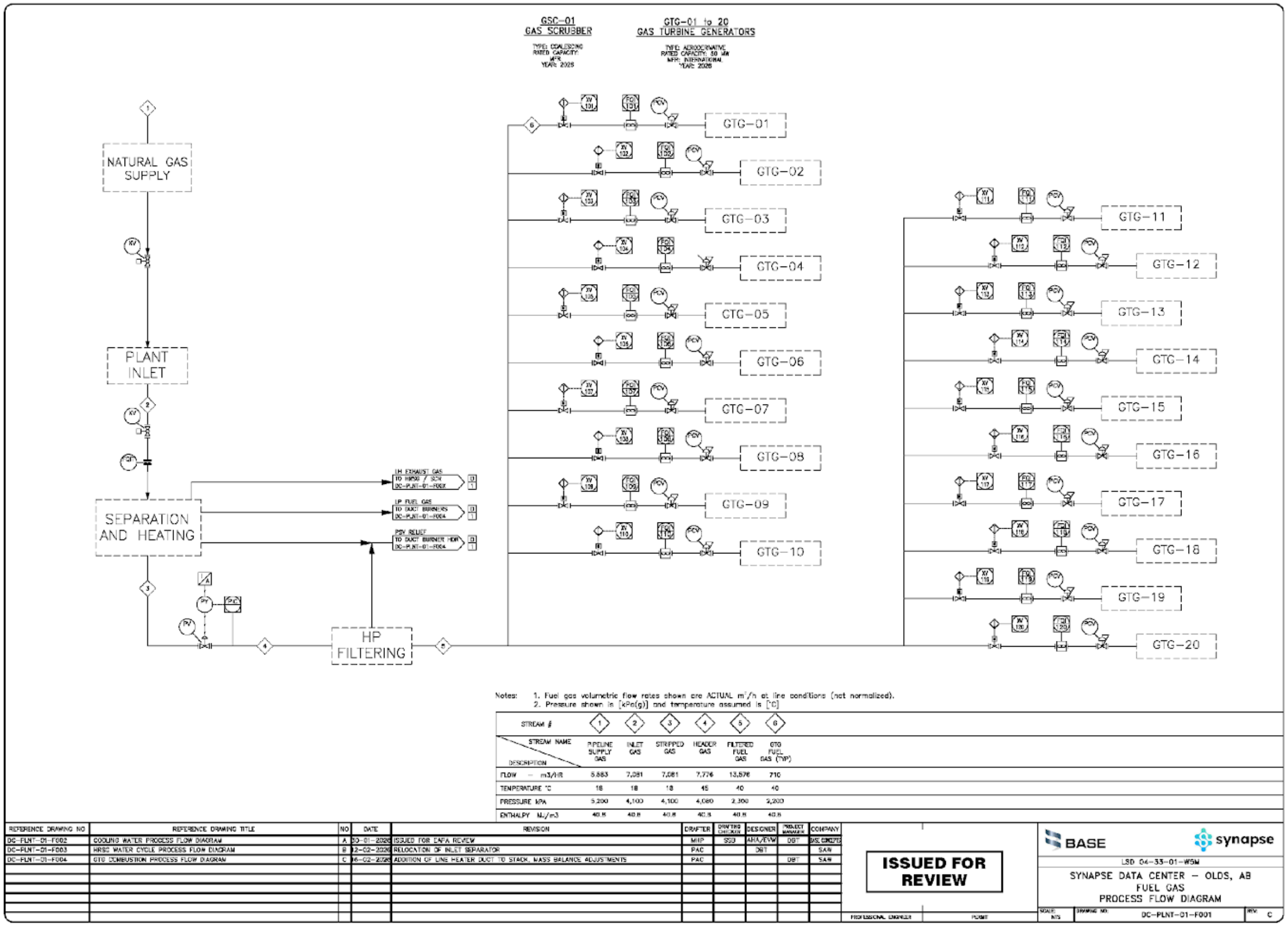


Figure D-1.3- Fuel Gas Process Flow Diagram

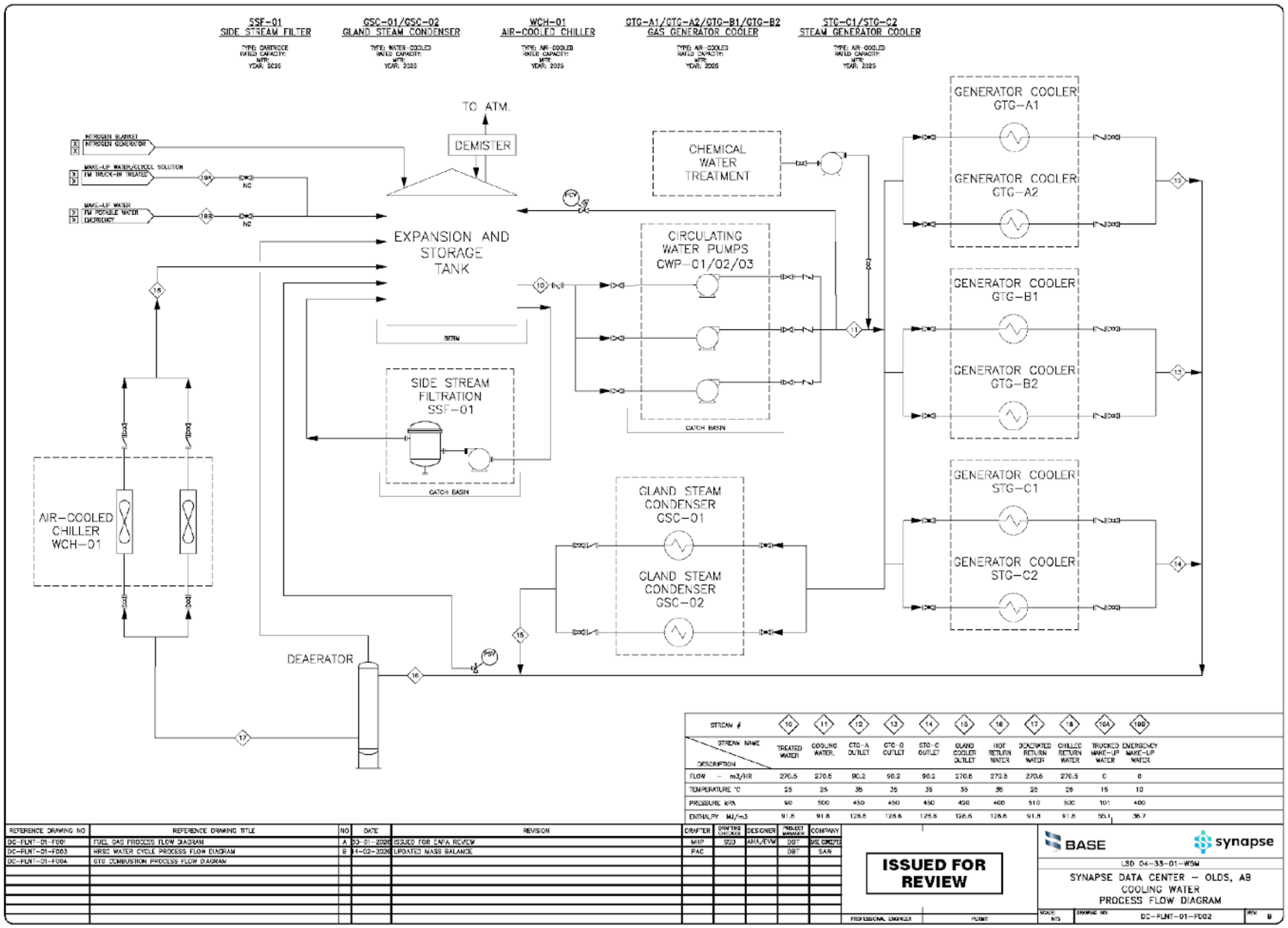


Figure D-1.4- Cooling Water Process Flow Diagram

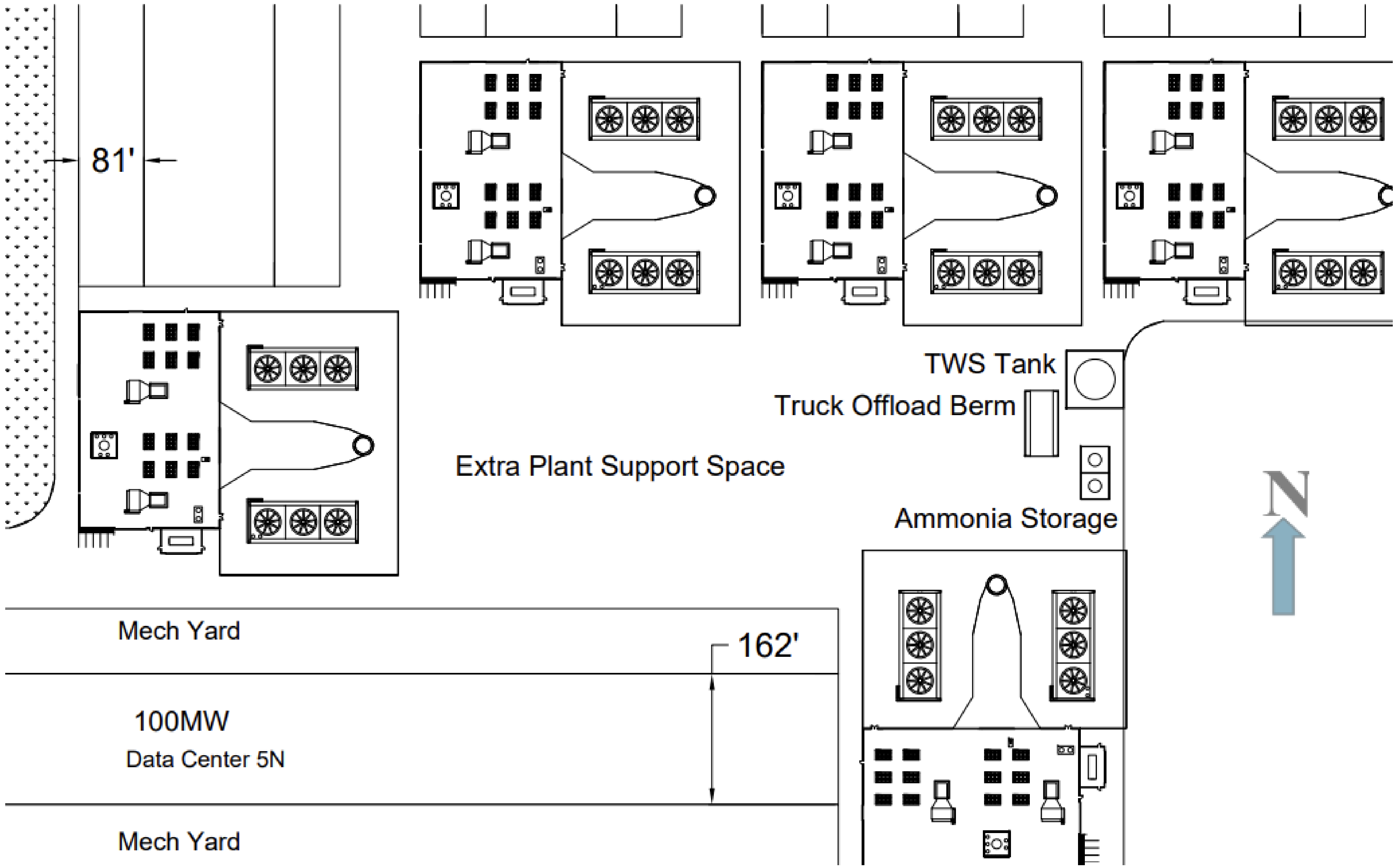


Figure D-1.5- Plant Layout - Site

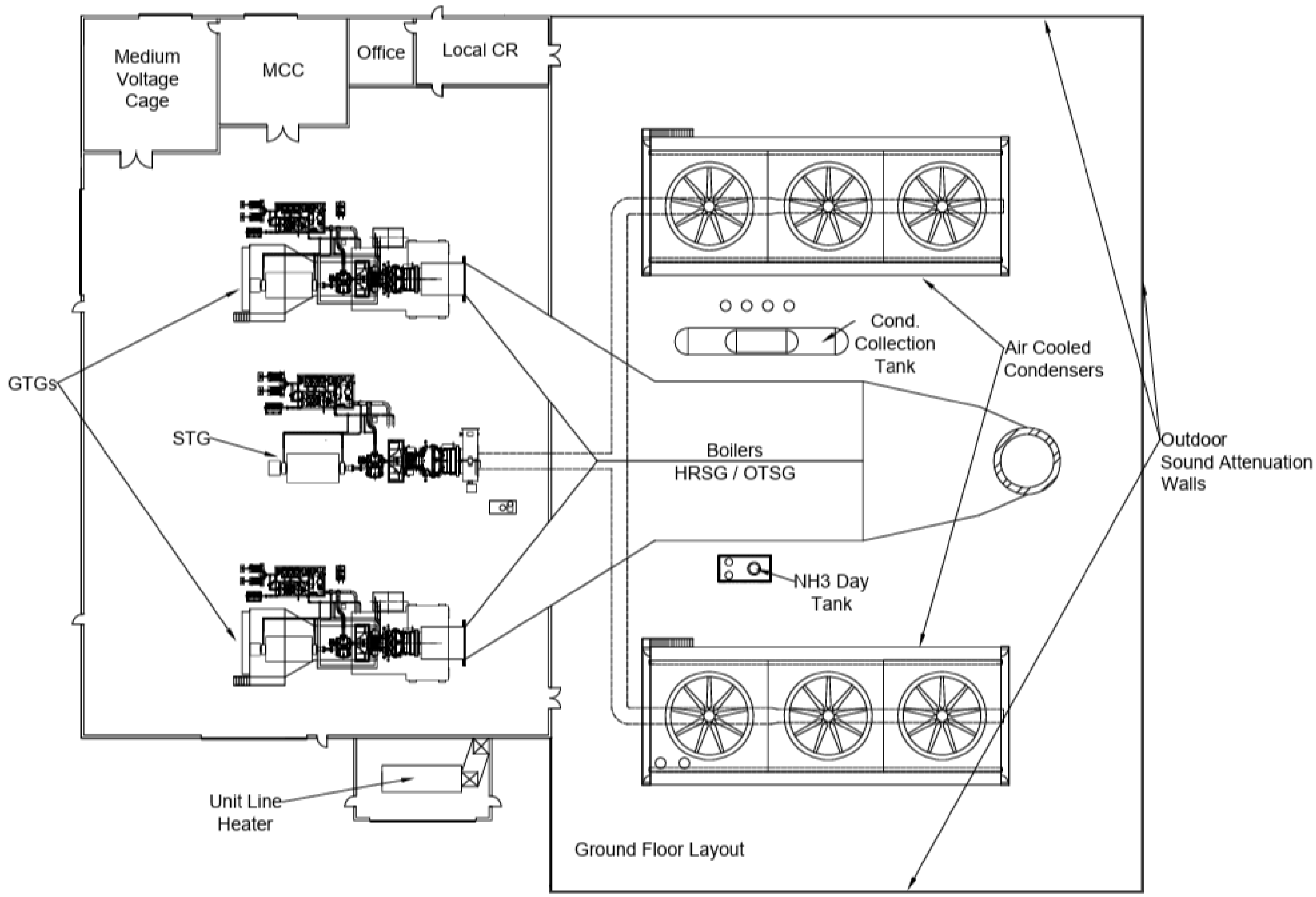


Figure D-1.6- Plant Layout - Ground Floor Close Up

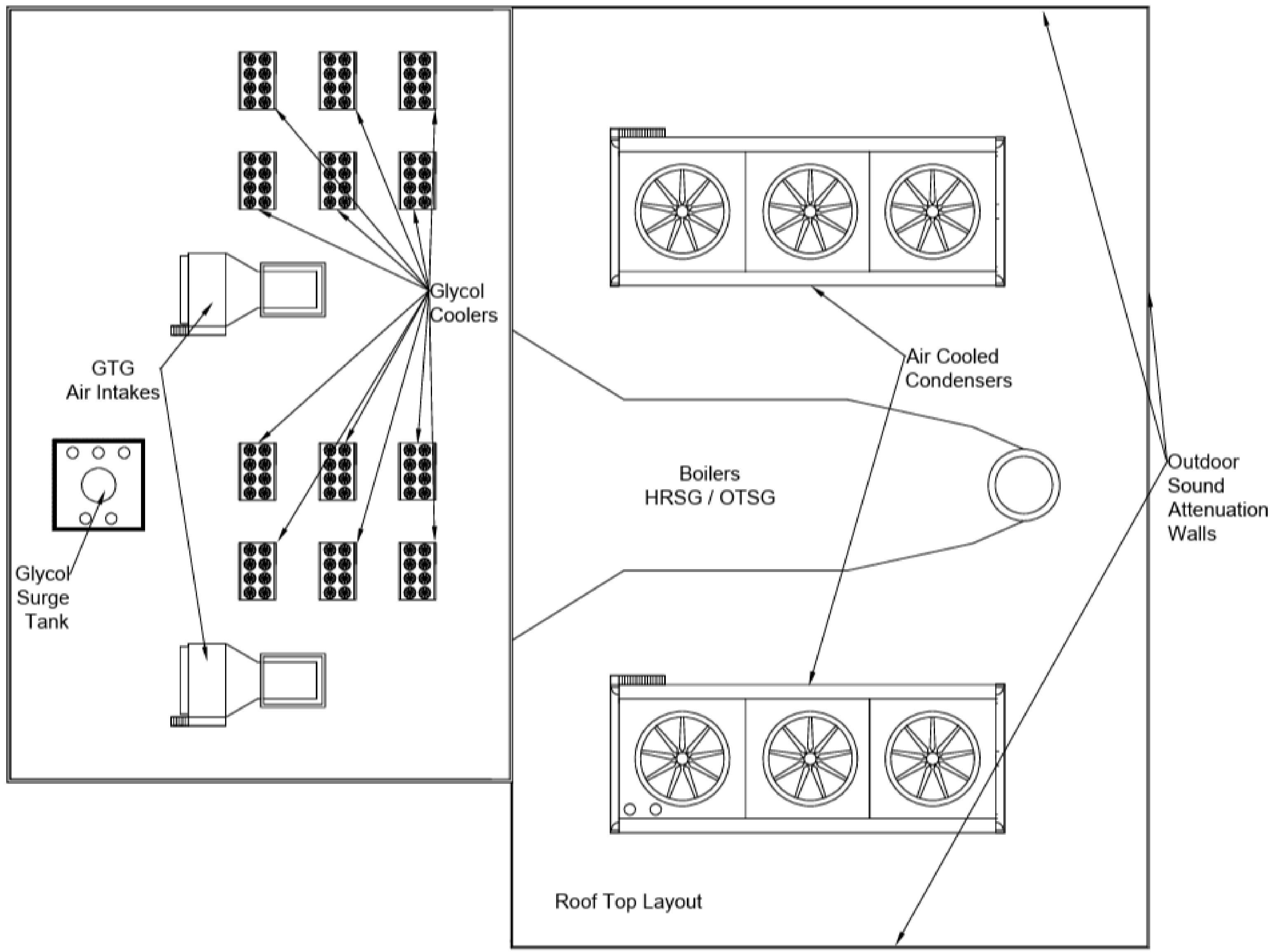


Figure D-1.7- Plant Layout - Roof Top Close Up