3.6 Infrastructure Requirements

3.6.1 Temporary Requirements

During the construction phase of the project, temporary requirements will include:

» *Equipment*

The equipment used during the construction phase (see Section 3.4.2) will only be needed temporarily, and will be sourced as specified by the civil contractor. The equipment will be stored on site in the vicinity of the incinerator location and in accordance with the construction EMP (in particular, bunding may be required around the stormwater drains).

» *Services*

An increase in existing road, water and electricity services may occur during the construction phase. A small increase in water services will occur in order to spray the site when earthworks are occurring (dust suppression) and to wash down the site. Electricity will be required for some construction equipment such as small hand tools and machinery.

Road infrastructure will be subject to an increase in truck/vehicular movements, as trucks are required to bring in parts and small machinery for construction. Additional transport may be required for construction staff.

3.6.2 Permanent Requirements

The proposed quarantine waste facility will require permanent use of the following:

» *Electricity*

The site will require power during the ongoing operation of the incinerator. It is proposed that a connection will be made to DPC's existing power supply line that transverses along the western edge of the site. The maximum amount of electricity that the facility would utilise would be 200 kWh and 200 amps with normal operations drawing approximately 100 amps at 150 kWh.

» *Water*

A water source will be required for the operation of the incinerator, and this will also need to incorporate a supply of water for fire protection. The water is to be obtained from the existing mains at East Arm Wharf.

» *Gas*

The incinerator requires LPG as its fuel source. Two 30 kL above ground tanks will be permanently located on the east boundary of the compound, greater than 30 m from the incinerator.

The incinerator will consume approximately 150 kg of fuel per hour. Typically, one week of operation will consume 30 kL of gas. Two 30 kL LPG above ground tanks will be installed. This allows one to be filled each week and approximately two weeks supply to be available at any one time.

» *Sewerage*

The amenities constructed within the incinerator building will be connected to the current sewerage system at East Arm Wharf.

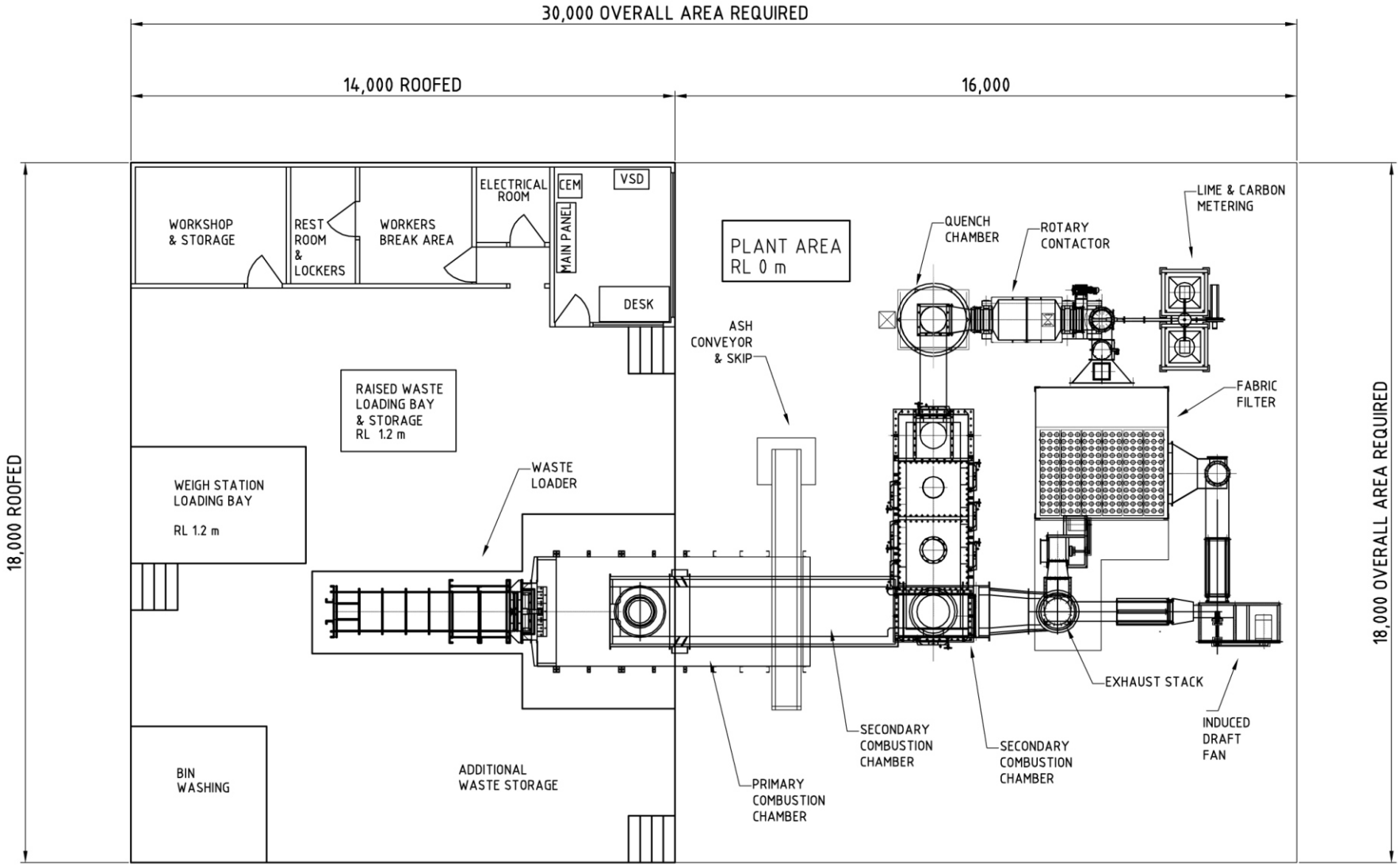
» *Road*

An internal road system will be developed to service the incineration facility. A single lane, one-way road, will be constructed to cater for the waste transport vehicles and provide safe and effective access for personnel and emergency vehicles. The road constructed for the incinerator will connect to the transport system presently established within East Arm Wharf.

3.7 Proposed Quarantine Waste Treatment Facility Design

The concept design produced for the incinerator is indicative only and is subject to further detailed design. Such detailed design changes should not impact significantly on the design and operational concepts presented in this document, upon which the environmental assessments have been made. Variations of the incinerator are available and will depend upon the contract service provider. Any variations to the concept design however, must still meet the specific requirements and function for each incinerator component, including the associated heat recovery and air pollution control equipment.

Figures 3-3 and 3-4 illustrate the concept design and process.



Source: Advanced Combustion Engineering Pty Ltd

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Quarantine Waste Treatment Facility Public Environmental Report

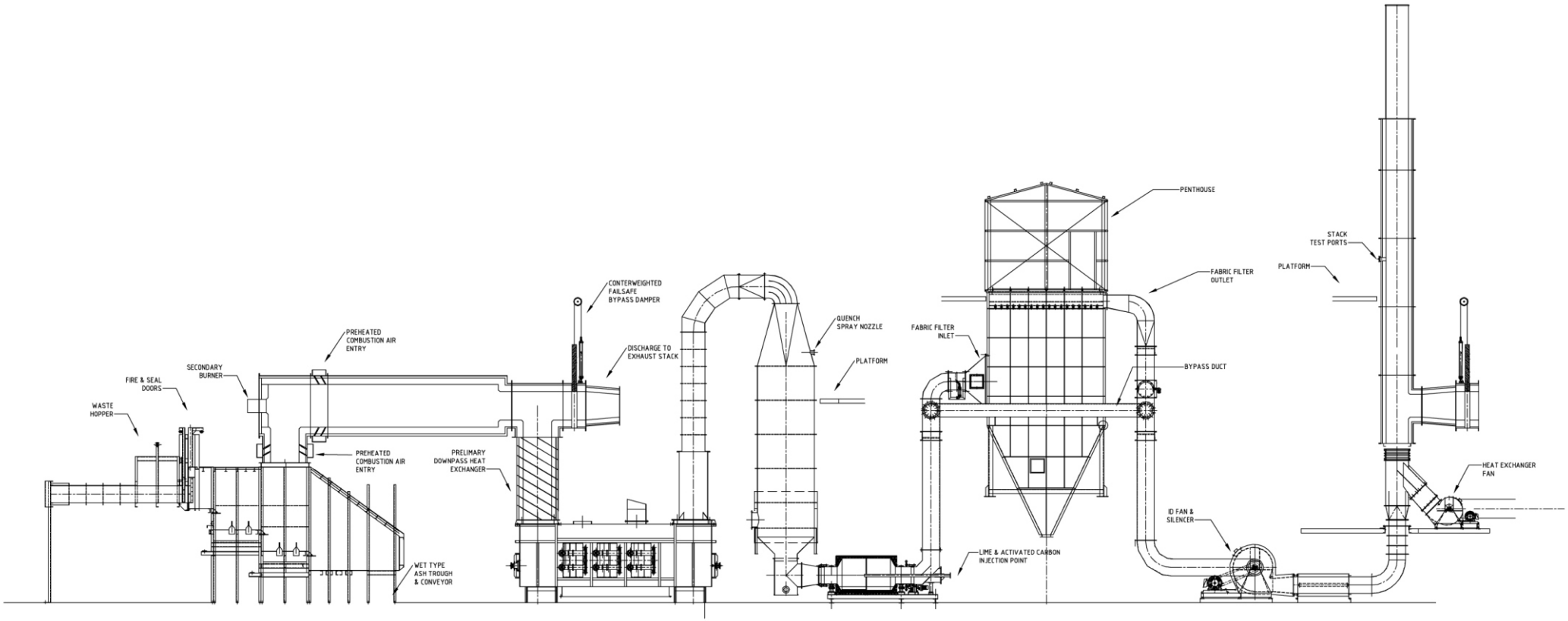
Concept Design Building Layout

scale | date | 2 June 2006

job no | 43-20914
file ref | 43209142_LTN_02.cdr

Figure 3.3

Level 5, 66 Smith Street, Darwin NT 0800 Australia **T** 61 8 8982 0100 **F** 61 8 8981 1075 **W** www.ghd.com.au



Source: Advanced Combustion Engineering Pty Ltd

3.7.1 Transportation of Waste

Quarantine waste will be brought to the facility by trucks from the East Arm Wharf, Stokes Hill Wharf (in the case of cruise liners), Fort Hill Wharf, Iron Ore Wharf, Darwin Naval Base (and other regional defence operations) and Darwin International Airport, as required. In addition, the Royal Darwin Hospital and other health care services will potentially ship small quantities of biomedical waste not suitable for treatment by Autoclave. The trucks will access the site though the Gatehouse, along the main sealed road, and enter the site east of the transit shed.

3.7.2 Waste Storage

All waste will be received in a sealed and secure fashion as per AQIS requirements. Where wastes are to be stored for longer than 24 hours the waste will be stored in refrigerated shipping containers located within the transit shed.

The trucks will proceed to a weigh station/loading bay or to designated storage areas within the incinerator building or transit shed. The waste bins will be loaded onto the waste loader. The waste loader will hydraulically lift the waste to a height above the waste loading chute, tip the waste into the loading chute from where it is hydraulically rammed into the primary chamber through an automated fire door.

3.7.3 Treatment Process

Following is a brief description of the incineration process and corresponds to the equipment shown in Figure 3-4.

» *Primary Combustion Chamber*

The primary combustion chamber is of a stepped hearth configuration into which waste is automatically fed from the waste loading chute via a hydraulic ram and automated fire door. Temperatures in the primary chamber will vary from 750°C to 950°C and will operate in either an oxidising or reducing mode via controlling the available combustion air though a set controlled air cycle. A quench system will ensure that the primary chamber temperatures do not exceed 950°C, to avoid slagging of glass wastes onto the refractory.

The stepped hearth allows burnt wastes to be progressively moved through the incinerator and allows sufficient residence time for complete burn out of wastes. This movement also allows for some mixing of the wastes, thus avoiding the situation in static hearths where some wastes can escape incineration by being insulated by other waste materials. The resultant ash and residues from the chamber are deposited in an ash pit where water mist sprays cool the waste without making it wet.

The primary chamber will be able to accept up to 450 kg/hr (average) of waste although this will actually depend on the volume, bulk density and calorific value of the waste. A minimum throughput of 300 kg/hr is envisaged during the initial commissioning and operations.

» *Secondary Combustion Chamber/Afterburner*

The secondary combustion chamber or afterburner must be able to fully oxidise and destroy the emissions from the primary chamber. It will be designed to operate at 1200°C, with a minimum residence time of two seconds under oxidising conditions. This temperature will also ensure that sufficient turbulence occurs between waste gases and flame gases through the length of the chamber. At this

temperature and residence time all unburnt organics or other species not fully oxidised will be completely burnt (oxidised).

» *Adiabatic Quench*

An adiabatic quench uses water to rapidly reduce gas temperatures (and consequently gas volumes) after the secondary combustion chamber/afterburner. This is particularly important as it is now recognised that dioxins and associated furans are generated via a process of reformation at around 550°C. By getting below this temperature as quickly as possible the opportunity for dioxin formation is reduced.

» *Ceramic Tube Heat Exchanger*

Further heat is taken from the gas stream via a ceramic heat exchanger, which provides opportunities for the generation of hot water and/or steam for bin cleaning and the cleaning of waste loading and receiving areas.

» *Rotary Contactor*

Lime and activated carbon are injected into the gas stream where they mix with the waste gases before being deposited onto the fabric filter particulate collector (baghouse).

» *Fabric Filter Dust Collector (Baghouse)*

The fabric filter particulate collector (baghouse) collects the lime and activated carbon mix through which the waste gases must pass. As the waste gases pass through the filter cake on the bags, the lime neutralises over 95% of the hydrogen chloride present as well as some of the other acid gases present. The activated carbon serves to collect residual organics, dioxins/furans and heavy metals ensuring that the waste gases exhausted to atmosphere meet all designated emission criteria.

» *Induced Draft Fan*

The large induced draught fan sucks the waste gases through the system ensuring that there is negative pressure throughout, such that if a fire door is opened, or any inspection portal, gases will flow into the incineration facility and not from it. After the air quality control system, the fan blows air up the exhaust stack for discharge to atmosphere.

» *Exhaust Stack*

The exhaust stack ensures that emissions can disperse to the levels required under a range of operating conditions, including an emergency bypass mode whereby emissions are discharged directly to atmosphere due to a critical failure of control equipment. For example, if the adiabatic quench fails then emissions must temporarily pass to the atmosphere to avoid a baghouse fire.

» *De-ashing Facility*

The ash pit collects ash and other non-combustible residues in a large steel bin. After removal and cooling, this ash can be disposed of to landfill if relevant leachate criteria are met. If leachate criteria are exceeded then immobilisation of ash would be required prior to disposal to landfill. Non-combustible components of the quarantine waste stream, such as glass and metal, also remain in the ash.

3.8 Ongoing Management, Maintenance and Administrative Requirements

The DPC, in accordance with DPC procedures, guidelines and a tailored Operational EMP, will oversee the ongoing management of the facility.

Trained DPC personnel will undertake ongoing maintenance of the facility in accordance with the Operational EMP and waste facility specifications. This usually involves a series of daily, weekly, monthly, quarterly and annual servicing and maintenance requirements. DPC personnel will also undertake the daily administrative requirements for the facility, in particular completing a daily checklist of waste and ash storage areas, and of the incinerator as per the incinerator manufacturer's specifications.

The ongoing management of the facility is described in detail in Section 7 Environmental Management Systems of this PER.