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Appendix D

Preliminary Hazard Analysis Report

PRELIMINARY HAZARD ANALYSIS REPORT
FOR A MEDICAL WASTE FACILITY
AT 9 KENOMA PLACE, ARNDELL PARK

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Report No: 168220_PHA_Rev7
December 2018
(Released: 11 December 2018)

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DOCUMENT REVISION RECORD

Revision	Date	Description	Checked	Approved
1	16-01-2017	Draft / Rev1	N Israel	R T Benbow
2	24-02-2017	Rev2	N Israel	R T Benbow
3	23-05-2017	Rev3	N Israel	R T Benbow
4	19-12-2017	Rev4	N Israel	R T Benbow
5	8-1-2018	Rev5	N Israel	R T Benbow
6	26-6-2018	Rev6	N Israel	R T Benbow
7	11-12-2018	Rev7	N Israel	R T Benbow

DOCUMENT DISTRIBUTION

Revision	Issue Date	Issued To	Issued By
1	25-01-2017	State Waste Services	Benbow Environmental
2	24-02-2017	State Waste Services	Benbow Environmental
3	23-05-2017	State Waste Services	Benbow Environmental
4	19-12-2017	State Waste Services	Benbow Environmental
5	8-1-2018	State Waste Services	Benbow Environmental
6	26-6-2018	State Waste Services	Benbow Environmental
7	11-12-2018	State Waste Services	Benbow Environmental

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EXECUTIVE SUMMARY

State Waste Services, based at 9 Kenoma Place, Arndell Park, NSW, proposes to collect and process 3,000 tonnes per annum of clinical and related wastes using an Autoclave in accordance with the Australian and New Zealand Clinical Waste Management Industry Group (ANZCWMIG) Code of Practice for the Management of Clinical and Related Wastes. This is an existing facility that has been operating since 2013 with an approved processing quantity of 650 tonnes.

Autoclaving is the industry accepted best practice method for sanitising and treatment of clinical and related wastes, and is a widely adopted process in the health industry.

Autoclaving has been in widespread use for bacterial destruction in the health industry for many years and is a common occurrence in hospitals. The process is well understood and operates with low risks.

This document presents a Preliminary Hazard Analysis (PHA) required to fulfil the requirements of State Environmental Planning Policy (SEPP) 33 in accordance with the Multi-Level Risk Assessment Guidelines stipulated by Department of Planning and Environment in conducting such analysis. The purpose of the PHA is to assess whether the proposed development is offensive or hazardous, thereby posing an unacceptable risk to the surrounding community.

The site is approximately 1,492 m^2 in area and has currently been used for the approved processing of such materials for over three (3) years with excellent results. The site is fully serviced by utilities and has good access to major transport infrastructure.

Autoclaving involves the heating of infectious waste by steam under pressure. The autoclave process destroys microbial fauna and flora through the saturation of heat and moisture that renders the proteins in the microbes non-viable. Autoclaving is considered a more energy efficient and cost effective compared to chemical treatment systems. Autoclaving operations are preferred over other systems because of the inherent safety of the process.

Benbow Environmental has completed PHAs on several similar plants, all were approved and are operating effectively.

A Preliminary Hazard Analysis is required as more than 500 kg of clinical wastes, a Class 6 Division 6.2 Dangerous Goods, may be stored on site at any time. The basis of the 500 kg is from the screening table in Applying SEPP33. The current operations are processing all materials as these arrive on site with a minimum holding time which is normally less than 1 hour. Storage of materials is therefore classified as temporary and no overnight storage is occurring. A maximum of 2,000 kg of Class 6 clinical wastes would be temporarily stored on site at any one time.

An annual processing rate of 3,000 tonne would on average equate to 10 tonne per day based on advice provided. Hourly production rate would be between 0.8 and 1 tonne per hour.

The specification of the autoclave offered has a capacity of treating 500-600 kg of standard medical waste per cycle. This information is reasonably representative of the type of process than would be operated.

A cycle requires typically 50 minutes, hence at least 1050 kg could be in the autoclave being processed and another similar amount could be in bins waiting for processing.

The quantity stored on site is within either the autoclave or bins that keep the medical waste sealed from ambient air. Total storage at any one time could be 2,000 kg.

The operators of the site request approval for an annual processing of 3,000 tonnes.

A Class 6 Division .2 dangerous goods is an infectious substance. These are expected to contain pathogens – these are microorganisms that can cause disease in humans or animals.

Section 4 of the report identified and examined a number of potential events/consequence scenarios that could occur at the Site. The prevention and protection measures designed into the operation of each of the activities associated with each event were listed and discussed in a series of Hazard Identification Charts.

From the Hazard Identification Charts a list of potentially hazardous events was prepared which was then examined in greater detail to determine which events would be credible and may have significant impacts outside the Site boundary.

Potential release of pathogens into the air outside the building was modelled using AERMOD.

Ground level concentrations have been produced on contour diagrams from the site across to residential and commercial/industrial areas. Consequently, the risk criteria for land use safety planning specified in the Department of Planning, NSW documents *Hazardous Industry Planning Advisory Paper (HIPAP) No.4* and *Multi-Level Risk Assessment* guidelines would not be exceeded.

The ground level concentrations for a worst case event were found to be significantly below published data on infectious doses for pathogens at residential areas. The published data has been used in several previous similar PHAs that were approved and are operating effectively. The published data was referenced from studies undertaken by the Research Triangle Institute on behalf of the US EPA.

Section 7 of the report reviewed the proposed development in terms of the fire safety requirements necessary to comply with the relevant Australian Standards and *deemed to satisfy* requirements of the Building Code of Australia (BCA).

As standard operating procedure for industrial activities an emergency plan is needed. This is a widely adopted procedure whereby an industrial operation has a process in place that involves informing their commercial/industrial neighbours if an emergency event such as a fire should occur. An outcome of the Department of Planning SEPP33 process is also the preparation of an emergency plan. Hence, the nearby commercial premises identified in the report would be included in the emergency plan for notification.

The failure scenarios analysed found that the process is inherently safe and even if a high steam pressure event occurred the majority of the pathogens would be destroyed. Consequence estimations were conducted as due diligence and showed there would be negligible risk to the residential community or nearby industrial/commercial premises.

It is the conclusion of this PHA that the proposed development meets all the safety requirements stipulated by Planning NSW and hence would not be considered to be an offensive or hazardous development. The development as proposed would result in no increase in hazards to surrounding land uses. The autoclaving process is able to operate with minimal use of chemicals and this results in further removal of potential hazards when compared to the other methods of operation of clinical waste destruction facilities.

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1. INTRODUCTION

This document presents a Preliminary Hazard Analysis (PHA) required to fulfil the requirements of SEPP 33 in accordance with the Multi-Level Risk Assessment Guidelines stipulated by the Department of Planning and Environment, NSW in conducting such analysis. This document is prepared by a team of consultants from National Integrated Creative Solutions and the Benbow Group incorporating Benbow Environmental and RT Benbow & Associates.

1.1 SCOPE OF THE REPORT

This PHA has been carried out in accordance with the Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (HIPAP 6) as stipulated by the Department of Planning and Environment.

This study evaluates potential hazards imposed by the proposed operation of the Site on the surrounding environment and communities and makes recommendations on the relevant prevention/protection strategies necessary to minimise the impact and risk of human fatalities, property damage and environmental pollution.

The purpose of the PHA is to assess whether the proposed development is offensive or hazardous, thereby posing an unacceptable risk to the surrounding community. The risks associated with current operations of the site will only be qualitatively assessed if they are likely to increase the risks associated with the proposed operations, and vice versa. The autoclaving process is considered to be an inherently safe process. The autoclaving process is not reliant on a chemical treatment system or removal of particulate matters using HEPA filters and is therefore able to operate with less hazards and greater reliability than the alternate methods.

1.2 BACKGROUND TO THE PROPONENT

The proponent is State Waste Services Pty Ltd and is located at 9 Kenoma Place, Arndell Park, NSW.

State Waste Services currently hold two (2) Environment Protection Licences: Licence No 12609 to transport Category 1 and Category 2 trackable waste in NSW, and Licence No 20233 for the storage and the non-thermal treatment of hazardous waste.

State Waste Services are requesting approval to process up to 3,000 tonnes of medical waste per year.

2. OVERVIEW OF THE PROPOSED DEVELOPMENT

2.1 CURRENT OPERATIONS

State Waste Services provides a disposal solution for clinical and related waste generators such as medical facilities and related services. A single process or a combination of disposal methods is available to process this type of waste. Traditional waste disposal methods are incineration, chemical treatment and autoclaving. The selection of the process method is dependent on the specific types of medical waste streams and on the waste segregation being practised. Waste generators segregate their wastes into a range of coloured Mobile Garbage Bins depending upon the Waste Type e.g., clinical waste is placed in yellow bins, cytotoxic waste in purple bins and anatomical waste in burgundy bins.

Clinical waste includes material contaminated with blood or body fluid which may include bandages, dressing, gloves, masks, disposable theatre wraps and waste resulting from medical dental or veterinary research or treatment. Clinical waste is the typical waste that would be processed using the proposed autoclaving process.

Cytotoxic waste includes material, which is, or may be, contaminated with a cytotoxic drug during the preparation, transport or administration of cytotoxic therapy. Cytotoxic waste can only be incinerated.

Anatomical waste is identifiable body parts. This waste could include pathological specimens, biopsy specimens and tissues taken during surgery or autopsy and must be incinerated.

The application of autoclaving is the internationally adopted method for destruction of clinical wastes and is preferred over all other methods.

The autoclaving process is preferred as it is simpler, safer and is able to operate with low risk.

A further technical discussion is provided of the alternate methods. This information is useful for the appropriate regulatory authorities.

2.1.1 Incineration

Incineration involves the combustion of waste materials at high temperatures to produce an inert ash, carbon dioxide, and minimal pollutants. Incinerators are usually equipped with a Wet Scrubbing based system, Air Quality Control System that separates particulate matters from the waste gas stream and minimises aerosol pollutants below threshold limits set by EPA licence conditions. Exhaust gases are emitted to atmosphere via a stack. The residual inert ash, the final waste product, is transported to landfill. The incineration process typically consists of the following operations:

- Incinerable wastes are weighed prior to the incinerator loading process.
- Waste is tipped into the incinerator primary chamber that operates at a temperature above 650 degrees Celsius. Ash is pushed into an ash bin for disposal. The emanating gases pass through two other chambers that operate at or above 1,100°C, and 1,000°C respectively. Waste material is blended in the primary chamber to minimise natural gas usage via the use of the waste as a fuel.

- Incinerator generated gases (waste gases) are cooled via an air to air heat exchanger. The heated air from the air side of the heat exchanger is directed to a mixing chamber below the stack. When the waste gas has passed through the stack, and reaches the mixing chamber, the final mixed gas temperature is elevated above the dew point thus creating a clear exhaust plume.
- Quench and scrubber systems use a mix of Caustic Soda and water to cool the wastes gases and separate entrained fine particulate matters prior to discharge to atmosphere. Caustic soda is used to maintain the pH during quenching.

2.1.2 Chemical Treatment

A chemical treatment process relies, as its chief means of disinfection, on subjecting shredded biomedical waste to a high pH environment, generated by the addition of a metered quantity of Calcium Oxide (Quicklime fines) and water. The process of lime hydration and mixing with the shredded waste stream within a controlled residence time elevates pH and temperature thereby disinfecting the waste prior to compaction and transport to landfill.

The process steps involved include:

- Shredding waste to a size range of 20 to 30 mm to increase the surface area for chemical reaction;
- Disinfecting waste by the addition of calcium oxide and water under controlled conditions thus elevating pH and via heat of reaction, increase the temperature at times above 70°C; and
- Dewatering the admixture, compacting the waste residue and transporting to landfill.

The mechanical process is continuous, using shredders, screw conveyors, flow through mixing unit and dewatering screw, and compaction. A HEPA filtering system extracts odours or vapours from the hopper and mixer operations. To ensure the waste system is free of coliforms, monthly monitoring program tests for the presence of biological indicators, *Staphylococcus* and *Escherichia coli*, will be undertaken.

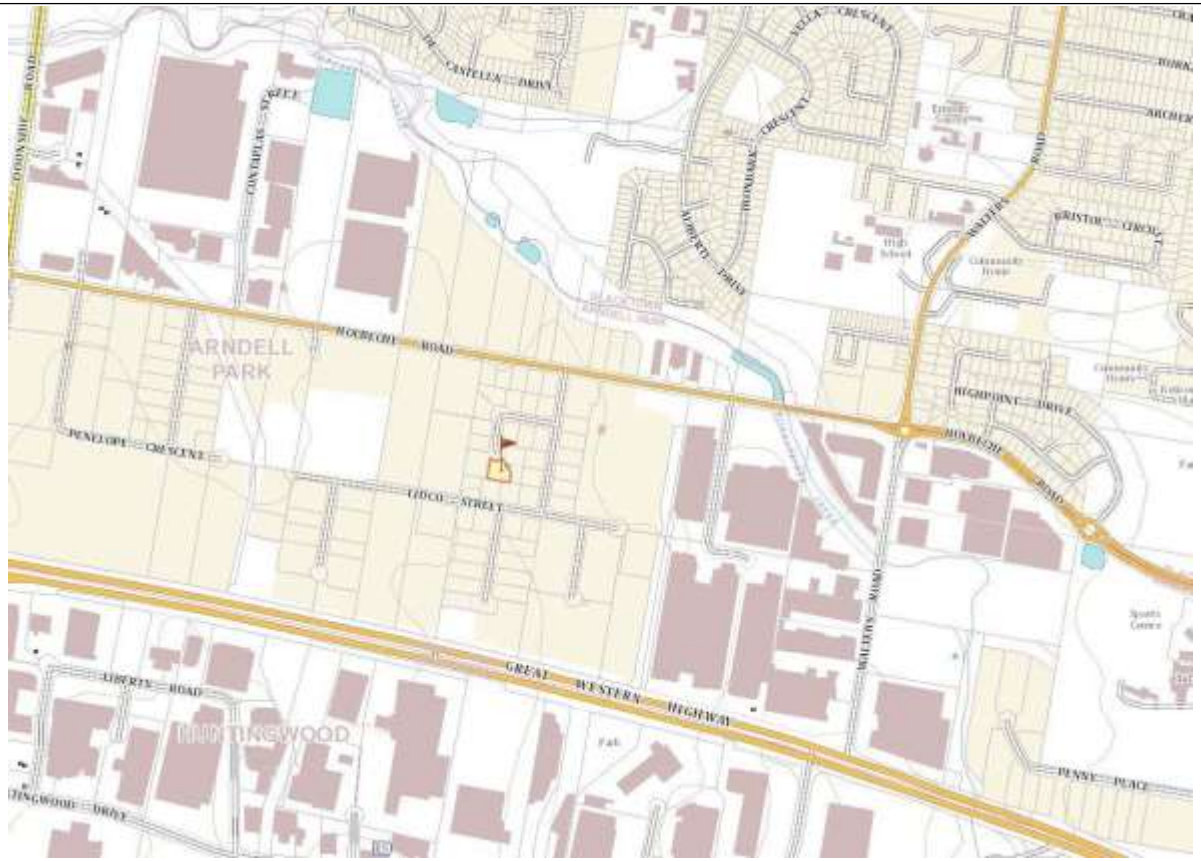
The autoclaving process is preferred to these two methods as it is simpler. It is safer and is able to operate with a lower level of risk than current methods in the medical waste disposal industry provided cytotoxic and anatomical waste disposal is not required.

2.2 PROPOSED DEVELOPMENT

The proposed location for the Autoclave is shown in the site plans enclosed (Figure 2-4).

Diagrams of the autoclaving process are provided in Section 2.2.2 of the report.

Figure 2-1: Site Location in a local context



Source: Six Maps

↑N Not to scale	LEGEND: Site boundary	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

Figure 2-2: Site aerial

Source: Six Maps

N Not to scale	LEGEND: Site boundary	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

Figure 2-3: Site

Source: Six Maps

↑N Not to scale	LEGEND: Site boundary	Benbow Environmental 13 Daking Street, North Parramatta NSW 2151

Figure 2-4: Site Plan

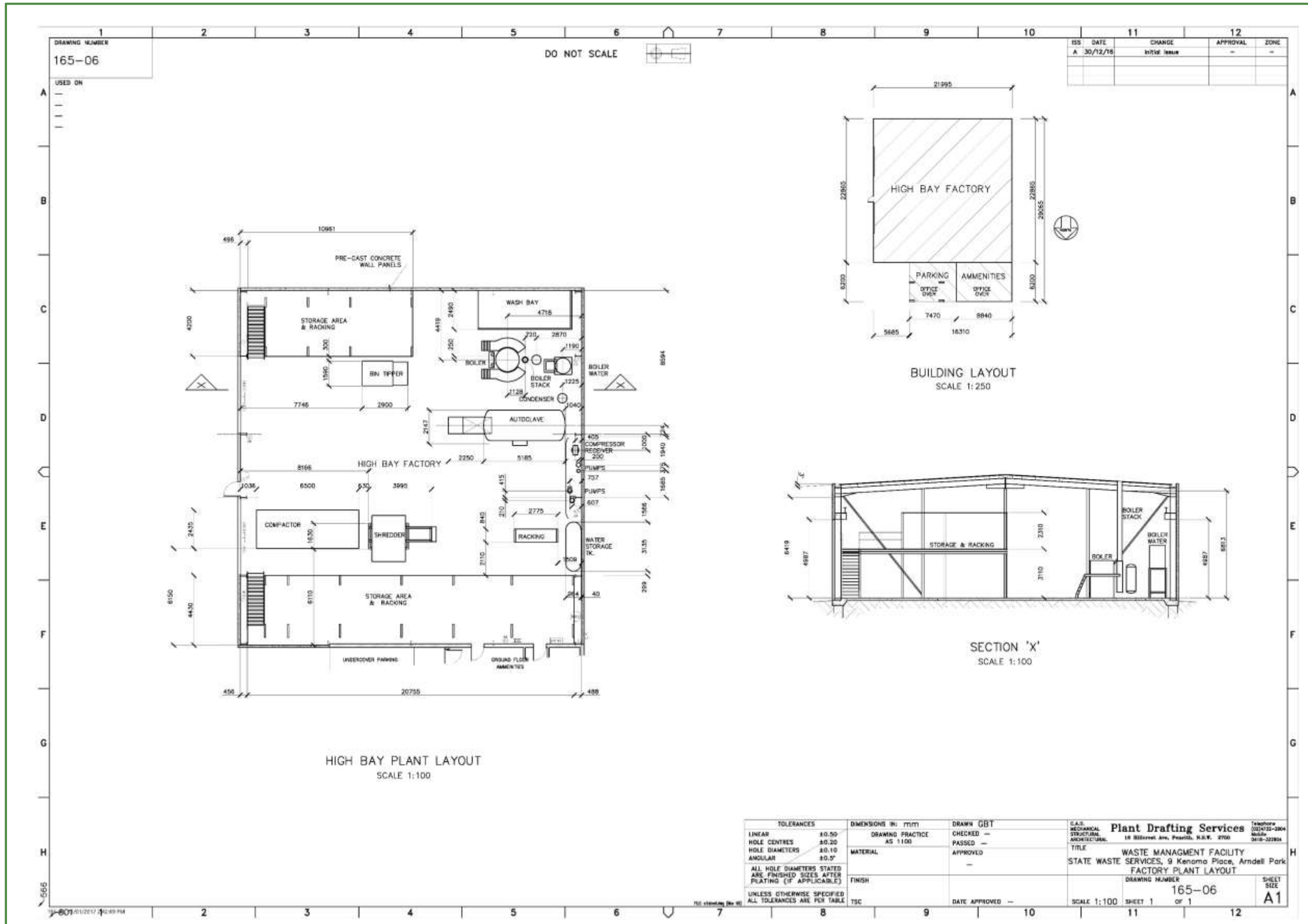


Figure 2-5: Amended Site Plan

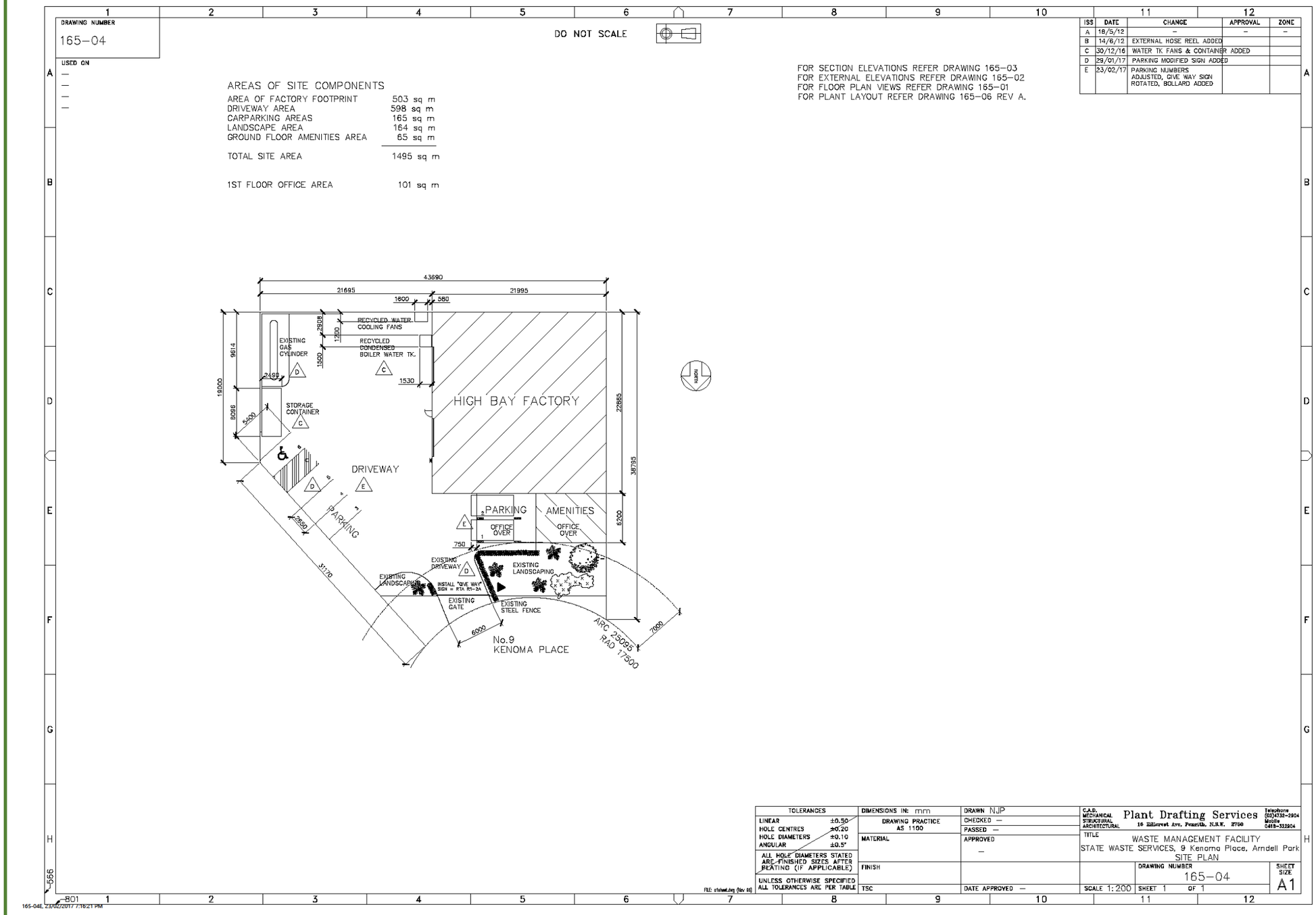
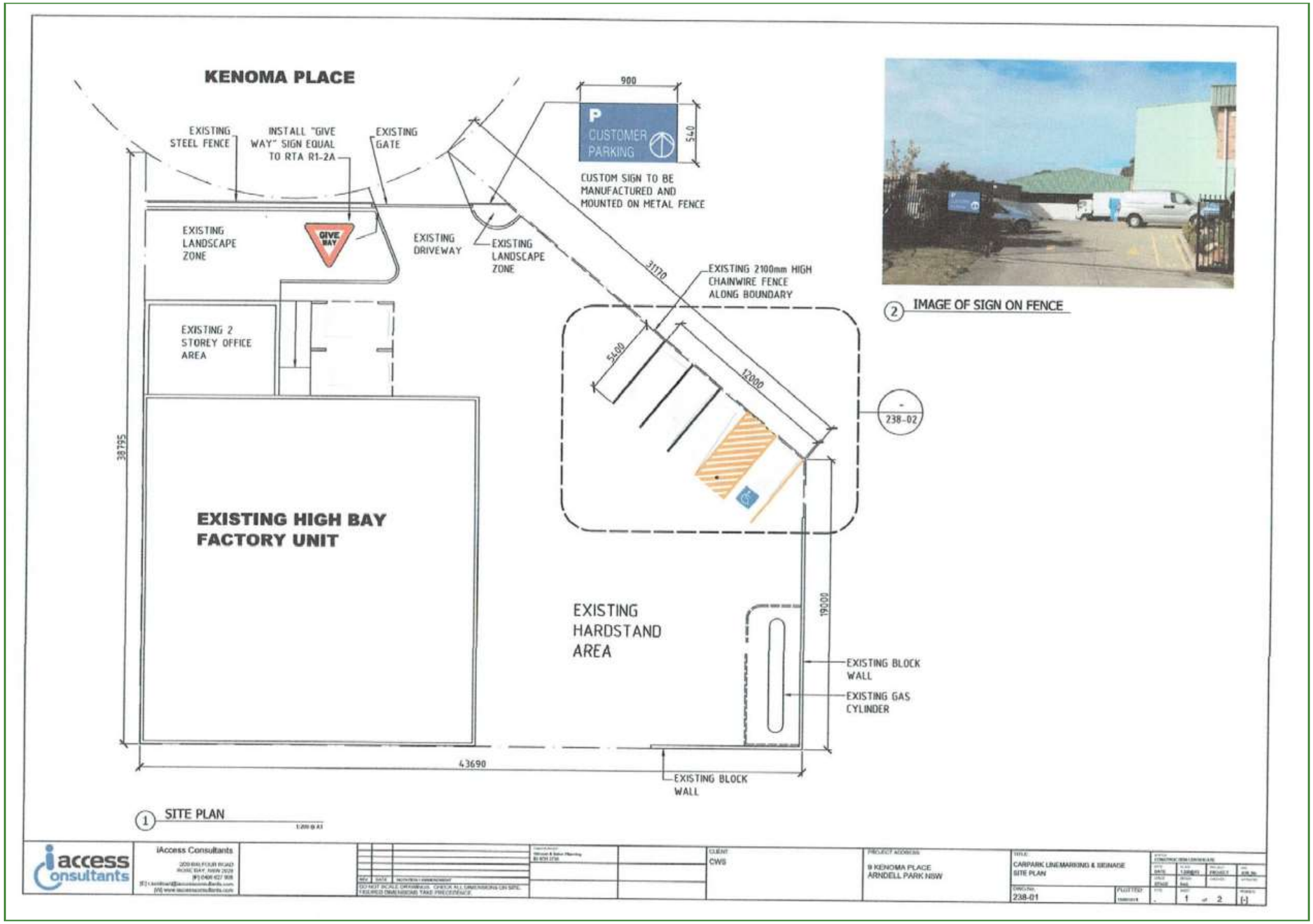


Figure 2-6: Site Plan Area



The building on site exists. The autoclave and associated services are also installed in the preferred locations shown in the Site layout and have been operating since 2013.

2.2.1 Objective of the Proposed Development

The objective of the proposed development is to expand the already established facility using autoclaving to treat the non-mandatory incinerable clinical and related waste generated by the bio medical waste industry.

Details on the size of the proposed facility are included in the Environmental Impact Statement. Annual processing of 3,000 T per year is requested. The autoclave would have a production rate of between 0.8 and 1 tonne per hour.

Figure 2-7 provides a pictorial explanation of the waste treatment process used by State Waste Services. A typical specification of an autoclave, albeit one with a smaller capacity than required, is provided in Attachment 1.

A more detailed discussion of the operation of Autoclaves including a diagram of the steam pipelines is provided in Attachment 2.

The following additional information is provided on the equipment in Attachment 3:

- Certificate of Plant for the pressurised gas tank (Attachment A); [7.5 KL-SU-617 – Cert of Reg Exp 22.03.2019.pdf]
- Pressure vessel certificate survey report for this same vessel (Attachment B); [7.5KL-SU-617 EXT INSP Mar 7.pdf] [Boiler testing My 2018.pdf]
- Evidence of the regular servicing of the boiler provided by EMS conducted in May 2018 (Attachment C);
- A detailed microbiological validation of Bondtech Sterilisation Unit BTT6X13 which is the Austoclave vessel at the proposed development site (Attachment D); [biological validation of autoclave.pdf]
- Certificate of inspection – pressure equipment (Attachment E); [pressure vessel inspections.PDF]

These documents support the viewpoint that the autoclave process is being conducted in accordance with the requirements of SafeWork NSW and at an adequate standard of control of destruction of biological matter.

Figure 2-7: Waste Treatment Process

2.2.2 Autoclaving Process

Autoclaving sterilises by subjecting infectious waste to high temperature and pressurised steam conditions. The principal of the autoclave process is to denature proteins through saturation of heat and moisture. This process destroys microbial flora and fauna existing in the biological waste.

The clinical and related waste is delivered in reusable double lined yellow clinical waste bins by fixed bed trucks approved by the NSW EPA for collection of these categories of waste. The scope of the collected waste would be limited to sharps, dressing and disposable linen, microbiological and pathological waste, human and animal tissue and body fluids.

The autoclave process involves the following steps based on information supplied:

- The clinical and related waste is weighed and emptied into the autoclave drawer prior to loading the drawer into the autoclave; The yellow bins are segregated, hand cleaned using hospital grade disinfectant, de-odourised and then transferred to the warehouse bin storage area ready for re-use;
- A thermocouple is placed into the autoclave drawer before the drawer enters the autoclave, to measure the temperature of the waste at the core. Another thermocouple measures the ambient temperature within the autoclave during the sterilisation cycle time; temperatures are recorded;
- The autoclave is closed and sealed, a vacuum is applied in the autoclave chamber;
- Steam is applied to the chamber, with a typical working pressure of 310 kPa and maintained to a temperature of approximately 134°–140°C for a period of 30 minutes. Steam condensate will drain to the site water tank and subsequently the closed loop water management system;
- At completion of the steam sterilisation process, a vacuum is again applied evacuating the steam and residual condensate. The evacuated contents are then pumped to the site's water tank. This system will prevent odours from being directly released into atmosphere.
- The drawer is removed from the autoclave before mechanically transferring the treated waste to a conveyor system.
- Waste is then fed to a shredder via the conveyor to render the waste unrecognisable and then drops into a waste compactor in preparation for landfill disposal.
- The autoclave waste is compacted and transported by truck to landfill.

The waste after autoclaving is sterilised and rendered harmless, the volume of waste from the process is reduced in volume by 40-60% at transport stage.

2.3 NEAREST RESIDENCES

The Site location is in an industrial area in Western Sydney at Arndell Park in the Blacktown City Council local government area. Refer to Figure 2-1 for precise Site location details. The closest residential dwellings are located at Marko Place, approximately 395 m north-north-east of the site. An Aerial photo is also provided as Figure 2-2 and an enlarged aerial of the site as Figure 2-3.

Evans High School is also to the north-north-east of the site at a similar large separation distance as residences.

The Great Western Highway is to the immediate south of the site. Huntingwood Industrial Area is further south.

2.4 Nearest Natural Waterway

The nearest natural tributary to the Site is Bungarribee Creek and is located at a distance of approximately 300 m north (and east) of the site.

2.5 Nearest Industrial/Commercial Premises

The site is located in an industrial area with surrounding commercial/industrial sites.

2.6 Proposed Hours of Operation

The Site autoclave operation hours will normally be 12 hours a day with a 6-day week, although at times the plant may operate 10 hours per day, 7 days a week.

2.7 Employment

The proposed employee shifts are one shift a day with up to a 12 hour shift and 6-day week. The proposed employee team will comprise of three process operators and three administration staff (six total).

2.8 Site Access

Trucks delivering waste or dispatching treated waste would enter and exit the Site via Kenoma Place having entered into this street of Vangeli Street and Holbeche Road.

Site access is typically 7am–7pm Monday–Saturday.

2.9 Vehicular Movements

A fleet of EPA licensed, fixed bed waste collection vehicles, averaging 18 truck movements daily within the Sydney Metropolitan Area.

Delivery vehicles would have a maximum capacity to carry waste materials as specified below:

- Van 300 kg
- SRV 2,000 kg
- MRV 12,000 kg

(SRV: small rigid vehicle; MRV: medium rigid vehicle.)

Details on the traffic operations are provided below.

Proposed Operations

- Approved hours of operation are 7am–7pm Monday to Saturday.
- Current on-site staff totals 6 employees are to be retained as existing.

- 2 additional contract drivers are to be added to the existing 6 drivers (an additional third driver could be engaged at a later date, if required)operating the following vehicles:
  - 9 (2 additional) vans;
  - 1 SRVs; and
  - 2 MRV.
- These contract vehicles travel to and from the site between 7 am and 5pm.
- The on-site waste treatment is to continue to occur as existing.
- The bulk collection bin is to be transported to and from the site as existing however the bin loading/unloading activity is typically to occur in the late afternoon (between 4pm–7pm) to ensure it occurs following the unloading and treatment of waste earlier in the day.
- The increased site operation will necessitate bulk collection bin loading/loading activity to occur once per day.
- Deliveries to the site will not be impacted by the increased site operation.
- The proposed vehicle movements are for an annual production rate of 3000 tonne.

Table 2-1: Proposed Traffic generation

	Passenger vehicles	Van	SRV	MRV	Total
Existing					
Per day					
In	5	18	1	5	29
Out	5	18	1	5	29
Total	10	36	2	10	58
Per AM Peak Hour					
In	5	2	1	1	9
Out	0	2	1	1	4
Total	7	2	2	2	13
Per PM Peak Hour					
In	0	2	0	1	3
Out	5	2	0	1	8
Total	5	4	0	2	11

2.9.1 Proposed Road System

Traffic routes will concentrate solely to major roads. No heavy vehicles would operate. The major roads which will be used as the delivery vehicle route for travelling to and exiting at the proposed site and are listed below:

- Motorways,
- Great Western Highway;
- Doonside Road, Walters Road or Reservoir Road, into
- Holbeche Road, into
- Vangeli Street, and then into
- Kenome Place.

2.9.2 Traffic Incident Management

All medical waste transport would be conducted in accordance with the Australian Dangerous Goods Code (ADGC) as specified by the Waste Management Guidelines for Health Care Facilities and the National Guidelines for Waste Management in the Health Care Industry (National health and Medical Research Council (NHMRC), March 1999).

All drivers are trained and licensed to transport biomedical wastes to and from the site. All waste containers would be labelled and all vehicles would be placarded in accordance with the ADGC and the NSW Health and NHMRC guidelines.

A Transport Incident Management Strategy has been prepared in accordance with current NSW Government requirements.

3. DANGEROUS GOODS STORAGE AND HANDLING

3.1 QUANTITIES OF DANGEROUS GOODS STORED AT THE SITE

The site currently contains a number of classes of dangerous goods. The classes, quantities and storage type other than the Class 6 medical wastes on site can be seen in the following table:

Table 3-1: Dangerous Goods Currently Stored on Site

Dangerous Goods Class	UN Numbers	Capacity	Storage Type
Class 6 Division 6.2	3291 PGIII	2000 kg	Roofed store
Compressed Natural Gas	1971	6,000 litres	Outside at SE end of site

Minor quantities of household cleaning products, typically 100 L, would be stored. Lesser amounts of lubricating oils.

3.2 DANGEROUS GOODS STORAGE REQUIREMENTS

The storage, handling and transport of all dangerous goods at the site will be based on the requirements set out in the Work Health and Safety Regulations 2017 and AS/NZS 3816:1998 *Management of clinical and related wastes*.

As a consequence of storing nil kg, the site would not require notification to SafeWork NSW. The site would process the clinical waste received on a daily basis so that none are stored but held for the time taken for the process of autoclaving to take place.

Placarding on the site and storage areas would be required. A register listing details of any chemicals on site is required.

As the site is the holder of an environment protection licence, an emergency plan is required as well as a pollution incident response management plan. These are able to be combined into a document that would be used by emergency services. Any emergency plan needs to satisfy the guidelines of Fire and Rescue NSW.

3.3 LOADING AND UNLOADING PROCEDURES

All medical waste would be loaded and unloaded in accordance with the NSW Health and NHMRC guidelines. All loading and unloading operations occur in a designated area inside the building.

3.4 WASTE GENERATION

The current and proposed operations of the site involve the processing of medical wastes from across Sydney and NSW. Wastes are transported to the site from waste generators including hospitals, dentists, doctors and pathologists, by EPA approved vehicles. Waste treated via the Autoclave and shredder system would reduce the waste volume by 40–60%. This waste is now classified as General Solid Waste and is transported off site at a rate of approximately 5 times every fortnight.

The quantity of waste received is determined by the commercial contracts won by the company, except that some waste is required to be incinerated for which there are other processing sites in Sydney to deal with these wastes.

The wastes generated on-site are typical of any commercial facility and they include:

- Waste generated by the employees such as food scraps, tissues, aluminium cans, plastic bottles, etc.
  The recyclable wastes are placed into a recycling bin which is collected by a council contractor for off-site recycling. The non-recyclable wastes are placed with the treated medical waste to be taken to landfill.

- Waste generated from packaging such as cardboard boxes, package wrapping, etc.
  Again the recyclable wastes, if they considered of household grade, are placed into a recycling bin which is collected by a council contractor for off-site recycling. The remainder of commercial wastes is placed in a specially dedicated bin which is transported by a licensed contractor.

4. HAZARD IDENTIFICATION

The hazard analysis and quantified risk assessment approach developed and recommended by the Department of Planning and Environment relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of off-Site risks to assess risk tolerability and land use safety implications. The Department of Planning and Environment has advocated a merit-based approach, the level and extent of analysis must be appropriate to the hazards present and therefore, need only progress to the extent necessary for the particular case.

4.1 METHODOLOGY

The procedures adopted by this study for assessing hazardous impacts involve the following steps:

Step 1: Hazard identification;
Step 2: Hazard analysis (consequence and probability estimations); and
Step 3: Risk evaluation and assessment against specific criteria.

The following sections of the report discuss the hazard identification and analysis process as prescribed by the Department of Planning in its document entitled *Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis* (DUAP 1992).

4.2 HAZARD IDENTIFICATION

This is the first step in the risk assessment. It involves the identification of all theoretically possible hazardous events as the basis for further quantification and analysis. This does not in any way imply that the hazard identified or its theoretically possible impact will occur in practice. Essentially, it identifies the particular characteristics and nature of hazards to be further evaluated in order to quantify potential risks.

To identify hazards, a survey of operations was carried out to isolate the events which are outside normal operating conditions and which have the potential to impact outside the boundaries of the site. In accordance with HIPAP 6, these events do not include occurrences that are a normal part of the operation cycles of the site but rather the atypical and abnormal, such as the occurrence of a significant spill that may include liquid, during product transfer operations.

4.3 HAZARD ANALYSIS

After a review of the events identified in the hazard identification stage and the prevention/protection measures incorporated into the design of the site, any events which are considered to have the potential to result in impacts off-site or which have the potential to escalate to larger incidents are carried to the next stage of analysis.

4.3.1 Consequence Estimation

This aspect involves the analysis and modelling of the credible events carried forward from the hazard identification process in order to quantify their impacts outside the boundaries of the site. In this case these events typically include explosion, fire fume, dispersion/propagation and stormwater contamination and their potential effects on people and/or damage to property.

4.3.2 Probability Likelihood Estimation

Where necessary, the likelihood of incidents quantified as a result of Section 4.3.1 are determined by adopting probability and likelihood factors derived from published data.

4.3.3 Risk Evaluation and Assessment

The risk analysis includes the consequences of each hazardous event and the frequencies of each initiating failure. The results of consequence calculations (radiation and overpressure contours, and toxic exposure levels) together with the probabilities and likelihood's estimated are then compared against the accepted criteria, as specified by Department of Planning and Environment, NSW applicable for the site. Whether it is considered necessary to conduct the predictions would depend on the probabilities and likelihood estimated and if the risk criteria are exceeded.

4.4 ASSESSMENT CRITERIA

The risk criteria applied by Department of Planning and Environment NSW is published in their document *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* (2011). Following is a general discussion of the criteria that is used to assess the risk of a development on the surrounding community and environment.

4.4.1 Individual Fatality Risk Levels

The following paragraphs are reproduced from HIPAP No. 4 relating to individual fatality risk levels:

> *"People in hospitals, children at school or old-aged people are more vulnerable to hazards and less able to take evasive action, if need be, relative to the average residential population. A lower risk than the one in a million criteria (applicable for residential areas) may be more appropriate for such cases. On the other hand, land uses such as commercial and open space do not involve continuous occupancy by the same people.*
>
> *The individual's occupancy of these areas is on an intermittent basis and the people present are generally mobile. As such, a higher level of risk (relative to the permanent housing occupancy exposure) may be tolerated. A higher level of risk still is generally considered acceptable in industrial areas."*

The risk assessment criteria for individual fatality risk are presented below.

Table 4-1: Individual Fatality Risk Criteria

Land Use	Risk Criteria x 10^{-6}
Hospitals, schools, etc	0.5
Residential	1
Commercial	5
Sporting and active open space	10
Industrial	50

4.4.2 Injury Risk Levels

Injury risk levels from HIPAP No. 4 are stated below for heat of radiation.

- Incident heat flux radiation at residential areas should not exceed 4.7 kW/m^2, at frequencies of more than 50 chances in a million per year.

- Incident explosion overpressure at residential areas should not exceed 7 kPa, at frequencies of more than 50 chances in a million per year.

The requirements for toxic exposure are stated as follows:

- Toxic concentrations in residential areas should not exceed a level that would be seriously injurious to sensitive members of the community following a relatively short period of exposure at maximum frequency of 10 in a million per year.

- Toxic concentrations in residential areas should not cause irritation to the eyes or throat, coughing or other acute physiological responses in sensitive members of the community over a maximum frequency of 50 in a million per year.

Please note that a risk hazard assessment only examines events that are considered to have the potential for significant off-site consequences.

4.4.3 Risk of Property Damage and Accident Propagation

HIPAP No. 4 indicates that siting of a hazardous installation must account for the potential for propagation of an accident causing a "domino" effect on adjoining premises. This risk would be expected within an industrial estate where siting of hazardous materials on one site may potentially cause hazardous materials on an adjoining premises to further develop the size of the accident.

The criteria for risk to damage to property and of accident propagation are stated as follows:

- Incident heat flux at neighbouring potentially hazardous installations or at land zones to accommodate such installations should not exceed a risk of 50 in a million per year for the 23 kW/m^2 heat flux level; and
- Incident explosion overpressure at neighbouring potentially hazardous installations, at land zoned to accommodate such installations or at nearest public buildings should not exceed a risk of 50 in a million per year for the 14 kPa explosion overpressure level.

4.4.4 Criteria for Risk Assessment to the Biophysical Environment

HIPAP No. 4 indicates that siting of potentially hazardous developments also needs to consider the risk from accidental releases into the biophysical environment. Acute and chronic toxicity impacts are considered to be of most relevance.

The assessment of the ultimate effects from toxic releases into the natural ecosystem is difficult, particularly in the case of atypical accidental releases. Consequence data is limited and factors influencing the outcome variable and complex. In many cases, it may not be possible or practical to establish the final impact of any particular release. Because of such complexity, it is inappropriate to provide generalised criteria to cover any scenario. The acceptability of the risk will depend upon the value of the potentially affected zone or ecosystem to the local community and wider society.

The suggested criteria for sensitive environmental areas relate to the potential effects of an accidental release or emission on the long-term viability of the ecosystem or any species within it and are expressed as follows:

- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the effects or consequences of the more likely accidental emissions may threaten the long-term viability of the ecosystem or any species within it; and
- Industrial developments should not be sited in proximity to sensitive natural environmental areas where the likelihood or probability of impacts that may threaten the long-term viability of the ecosystem or any species within it is not substantially lower than the existing background level threat to the ecosystem.

4.4.5 Assessment Criteria Applicable to the Proposed Development Application

In accordance with *HIPAP No 4 Risk Criteria for Land Use Safety Planning* (2011), following is a discussion of the risk assessment criteria that shall be applied to the proposed development application.

4.4.5.1 Heat-Flux Radiation Criteria

There are no flammable gases or liquids stored on site. Natural gas fuels the boiler. Therefore any fire that occurs on-site will be most likely small and easily contained. Consequently, the criteria stipulated in HIPAP4 are readily satisfied and no further discussions are considered necessary.

4.4.5.2 Explosion Over-Pressure Criteria

- There will be no Class 1 explosive substances stored or handled at the site.

The autoclaving process involves the use of a pressurised vessel, therefore the risk and hazards associated with the operation of this vessel will be considered in detail.

4.4.5.3 Toxic Exposure Criteria

The autoclaving process involves the sterilisation of clinical and related waste, which may be classified as Class 6.2 dangerous goods and potentially contain pathogens. Therefore the consequences of a release of pathogens are considered in further detail.

Loaded trucks would be parked in Staging Area for typically 20 minutes period whilst waiting for vacancy in the plant. In the event of major plant breakdown, waiting period could extend to 6 hours. Infectious wastes collected from waste generators are generally stored in plastic lined bins for a number of days before collection. Access to Staging area would be limited during operating hours and the gates are locked when the area is unattended. Security cameras are also in place, limiting chances for vandalism. Therefore with these protective measures, storing waste in a truck for up to 6 hours is not considered as a potentially hazardous activity and hence is not investigated further.

4.4.5.4 Biophysical Environment Risk Criteria

In determining how such criteria should be applied to the site, it is important to note some of the critical aspects of the site's operations:

- Dangerous goods stored on the site have local bunding provided;
- Building and site bunding is provided to contain any spills;
- The site is to be fitted with stormwater isolation valves;
- Water quality devices will be installed at stormwater outlets to reduce the risk of stormwater pollution;
- Bin washing will be performed within a contained area to ensure that no contaminated material enters the surrounding environment; and
- Before discharge to the sewer all waste water from the site will be treated to ensure the requirements of Sydney Water and the site's trade waste agreement are met.

Considering the above aspects, the Site is considered to present a low risk to the local environment as the likelihood or probability of impacts that may threaten the long-term viability of the local environment is low to negligible. Consequently, the criteria stipulated in the DUAP document are readily satisfied and no further discussions are considered necessary.

4.4.5.5 Individual Fatality Risk Criteria

An estimate of the Individual Fatality Risk Criteria will be included as part of the analysis carried out in Section 8 of this PHA.

4.5 HAZARD IDENTIFICATION CHARTS

Hazard Identification Charts have been prepared for the following operating scenarios that are relevant to the proposed development application:

1. Truck loading/dispatch dock
2. Truck staging area
3. Bin lifter area
4. Waste holding area
5. Autoclave
6. Natural gas boiler
7. Treated waste compactor and shredder
8. Bin washing area
9. External areas
10. Transport of Medical Waste

Each chart consists of four columns:

Column 1

Heading: Functional/operation area
The area of the site involved with the potential event is listed, e.g. Autoclave.

Column 2

Heading: Possible initiating event
The individual events that are considered to be likely or realistic are then listed. Where the possible consequences are similar the events are listed together, each one individually numbered.

Column 3

Heading: Possible consequences
The outcomes of an event if it occurred are listed, e.g. damage to autoclave chamber during sterilisation causes a release of pathogens into the air.

Column 4

Heading: Prevention/protection measures
The measures designed into the functional/operation area and the site are listed. These measures may include for example safeguards, design features, management methods and/or operator training.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
1. Truck loading/dispatch dock	1. Damaged bin/pallet packaging delivered to site. 2. Bin/pallet dropped or damaged during unloading from truck.	1. Clinical and related waste products spill in delivery area. 2. Pathogens from the clinical and related waste released into the air. 3. Employees come into contact with clinical and related waste and are exposed to pathogens. 4. Clinical and related waste products enter the stormwater system and flow off-site.	1. Truck drivers are trained in the appropriate waste collection, driving and emergency response/spill procedures. 2. All bins and palletised waste delivered to site are inspected, sealed, locked and secured at the waste generators premises before delivery to the site. The contents of any damaged bins would be repacked in a new bin and the damaged bin returned to the site, cleaned and disposed of. 3. The waste contained within the bins is typically sealed in plastic bags by the waste generator prior to placement in the bin. In the event of a bin being damaged the waste would be contained within the plastic bag. 4. All employees are trained in the handling of clinical and related waste and are provided with appropriate personal protective equipment (PPE). 5. Employees are in attendance during all unloading operations and will implement spill control procedures and/or emergency response procedures in the event of a large spill. 6. All unloading operations are conducted within the building. The site is bunded to contain any spills, which could occur.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
2. Truck staging area	1. Truck parked in sloped area with unsecured handbrake. 2. Truck door is not locked allowing unsecured bin/pallet to roll out from the truck, spilling contents	1. Clinical and related waste products spill in truck staging area. 2. Pathogens from the clinical and related waste released into the air and spread out to surrounding premises. 3. Clinical and related waste products enter the stormwater system and flow off-site. 4. Cytotoxic waste mixed with clinical and related waste.	1. Staging area is used as waiting area when the plant is operating at full capacity. Trucks would be parked for typically 20 minutes. In the event of major breakdown, waiting period could extend to 6 hours. 2. Staging area is flat and will be concreted. 3. Water quality devices will be installed at stormwater outlets to reduce the risk of stormwater pollution 4. Surveillance camera will be installed and gates will be locked when not in use, limiting the chances for vandalism. 5. Transport containers are fully sealed so potential for spillage is negligible. 6. Truck drivers are trained in the appropriate waste collection, driving and emergency response/spill procedures. 7. Truck maintenance is conducted on regular basis to prevent malfunction.
3. Bin lifter area	1. Bin dropped or damaged during emptying into autoclave drawer. 2. Drawer overfilled during bin emptying. 3. Cytotoxic waste bin emptied into drawer.	1. Clinical and related waste products spill in bin empty area. 2. Pathogens from the clinical and related waste released into the air. 3. Employees come into contact with clinical and related waste and are exposed to pathogens. 4. Clinical and related waste products enter the stormwater system and flow off-site. 5. Cytotoxic waste mixed with clinical and related waste.	1. All employees are trained in the handling of clinical and related waste and are provided with appropriate PPE. 2. Employees are in attendance during all unloading operations and will implement spill control procedures and/or emergency response procedures in the event of a large spill. 3. Cytotoxic waste bins are a distinctive purple colour as opposed to the yellow clinical waste bins, the purple bins are identified, inspected and removed to a designated storage area before being treated via incineration elsewhere. 4. All unloading operations are conducted within the building. The building is bunded to contain any spills, which could occur.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
4. Waste holding area	1. Damaged bin delivered to site. 2. Bin dropped or damaged during unloading from truck.	1. Clinical and related waste products spill in delivery area. 2. Pathogens from the clinical and related waste released into the air. 3. Employees come into contact with clinical and related waste and are exposed to pathogens. 4. Clinical and related waste products enter the stormwater system and flow off-site.	1. All bins delivered to site are inspected and secured at the waste generators premises before delivery to the site. The contents of any damaged bins would be repacked in a new bin and the damaged bin returned to the site, cleaned and disposed of. 2. The waste contained within the bins is typically sealed in plastic bags by the waste generator prior to placement in the bin. In the event of a bin being damaged the waste would be contained within the plastic bag. 3. All employees are trained in the handling of clinical and related waste and are provided with appropriate personal protective equipment (PPE). 4. Employees are in attendance during all unloading operations and will implement spill control procedures and/or emergency response procedures in the event of a large spill. 5. All unloading operations are conducted within the building. The building is bunded to contain any spills, which could occur.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
5. Autoclave	1. Cross contamination of waste input with cytotoxic or other waste not suitable for autoclave treatment. 2. Temperature and pressure control malfunction. 3. Autoclave chamber door not closed during sterilisation 4. Autoclave chamber door opened before sterilisation process finished. 5. Autoclave chamber fails during sterilisation. 6. Steam boiler fails during sterilisation. 7. Steam control valve fails open or closed.	1. Autoclave unable to hold chamber pressure causing a release of steam through gaps in the seals on the doors. 2. Release of vapours that contain pathogens from unsterilised clinical and related waste. 3. Release of condensate into stormwater system 4. Sterilisation process does not meet the requirements of NMHRC and NSW Health guidelines for treatment of clinical and related waste. 5. Unsterilised clinical and related waste removed from the autoclave chamber and moved to the treated waste storage and shredder and sent to landfill. 6. Odour release to surrounding environment and employees (if plume large may escape to outside surroundings).	1. Doors of the autoclave are fitted with an interlock system, the interlock system must be engaged before the sterilisation process commences. 2. Waste treatment guidelines require the temperature of the waste in the autoclave to be monitored and recorded. In the event that the temperature, pressure or time required fail to satisfy the requirement of the guidelines, the waste will remain sealed in the autoclave chamber until the sterilisation cycle can be completed to satisfy the guidelines. 3. Initial trials to determine the optimum operating temperature and pressures will be conducted. Microbiological tests will be performed to ensure complete waste sterilisation during initial trials and when the operating parameters are modified at later stage. 4. Employees are trained in the autoclave operating procedures and are in regular attendance during all sterilisation processes. 5. Condensate from autoclave is treated and released to sewer. 6. The autoclave is fitted with pressure relief valves, which are regularly inspected. 7. Autoclave operation involves evacuating contents after sterilisation. The evacuated contents are pumped to the sites clarifier preventing release of odours from being directly released into atmosphere. 8. Regular maintenance procedures for autoclave by trained employees. 9. All employees are trained in the handling of clinical and related waste and are provided with appropriate personal protective equipment (PPE). 10. Regular Bio Indicator testing of Autoclave System to ensure waste sterilisation is complete for disposal to landfill. 11. Inherent safety exists in the autoclaving process as a higher steam pressure would destroy the pathogens rendering a negligible quantity available to be released.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
6. Treated waste compactor and shredder	1. Spill of treated waste at compactor discharge point.	1. Treated waste products spill in waste holding area. 2. Spilt treated waste is contaminated with untreated waste. 3. Treated waste products enter the stormwater system and flow off site	1. The autoclave process destroys microbial fauna and flora through the saturation of heat and moisture that renders the proteins in the microbes non-viable. The sterilisation process destroys all pathogens and the treated waste is considered harmless. 2. All employees are trained in the handling of clinical and related waste and provided with personal protective equipment. 3. Employees are in attendance during all transport operations and will implement spill control procedures and/or emergency response procedures in the event of a spill. 4. Bunding is provided for this area which is inside the fully bunded building, and the area is cleaned at every bin change occasion. 5. Spilt treated wastes are to be retreated in autoclave where appropriate.
7. Bin Wash Area	1. Clinical and related waste left in bin moved to bin wash area	1. Clinical and related waste products spill in wash area 2. Pathogens from the clinical and related waste released into the air. 3. Employees come into contact with clinical and related waste and are exposed to pathogens. 4. Clinical and related waste products enter the stormwater system and flow off-site.	1. The waste contained within the bins is typically sealed in plastic bags by the waste generator prior to placement in the bin. In the event of a bin being damaged the waste would be contained within the plastic bag. 2. All employees are trained in the handling of clinical and related waste and are provided with appropriate personal protective equipment (PPE). 3. Employees are in attendance during all washing operations and will implement spill control procedures and/or emergency response procedures in the event of a large spill. 4. All unloading operations are conducted within the building. The building is bunded to contain any spills, which could occur. 5. Bunding provided for the specific bin wash area which is within the fully bunded building. 6. Wash water is treated prior releasing to sewer. 7. Treated wastewater effluent is monitored and tested according to trade waste licence requirement.

Table 4-2: Event/Consequence Analysis Table

Functional/Operational Area	Possible Initiating Event	Possible Consequences	Prevention/Protection Measures
8. External Area	1. Damaged bin delivered to site. 2. Bin dropped or damaged during unloading from truck.	1. Clinical and related waste products spill in external areas 2. Pathogens from the clinical and related waste released into the air. 3. Employees come into contact with clinical and related waste and are exposed to pathogens. 4. Clinical and related waste products enter the stormwater system and flow off-site.	1. All clinical and related waste transport operations are conducted in accordance with the NHMRC and NSW Health guidelines. 2. The waste contained within the bins is typically sealed in plastic bags by the waste generator prior to placement in the bin. In the event of a bin being damaged the waste would be contained within the plastic bag. 3. All employees are trained in the handling of clinical and related waste and are provided with appropriate personal protective equipment (PPE). 5. Employees are in attendance during all unloading operations and will implement spill control procedures and/or emergency response procedures in the event of a large spill. 6. All unloading is undertaken inside the building to avoid such occurrence. 7. The site stormwater system will be fitted with stormwater isolation valves, in the event of a large spill the isolation valve will be closed.
9. Transport of Medical Waste	1. Transport container fractures due to traffic accident 2. Transport container falls from truck spilling contents. 3. Transport truck unloads at wrong location spilling contents outside designated area.	1. Spill is contained by truck operator or site personnel without any effect 2. Spill is not contained and finds its way into the stormwater system 3. Pathogens from the clinical and related waste released into the air. 4. Potential contamination of stormwater system with clinical and related waste.	1. Transport containers are of sturdy construction able to withstand significant impacts without fracturing. 2. Transport containers are fully sealed so potential for spillage is negligible. 3. All trucks are fully sealed to contain and spilled materials during transportation. 4. Truck unloading procedure is always supervised by site personnel who can provide guidance and assistance if required to do so. 5. Procedure and facilities for spillage control are maintained at the site for effective response. 6. All medical waste transport operations undertaken within the requirements of the ADG code, NHMRC and NSW Health guidelines. 7. Truck driver and site personnel have been trained in the correct spill clean-up procedure.

5. HAZARDS IDENTIFIED FOR FURTHER ANALYSIS

Following a review of the Hazard Identification Charts in Section 4.5, a further series of potentially hazardous events or scenarios were considered to require a comprehensive qualitative analysis. The events or further scenario shall be discussed in detail and the need for further analysis considered.

- Failure of the autoclave chamber producing a release of pathogens into the air.
- Release of steam pressure from the autoclave.

5.1 FAILURE OF THE AUTOCLAVE CHAMBER

The failure of the autoclave chamber and the associated pressure system has one major potential consequence:

- A small gap in the vessel chamber has potential for the release of pathogens from the clinical and related waste into the air.

Catastrophic failure is not a credible event as the door seals would release pressure, pressure regulators prevent excessive steam pressure occurring and relief valves on the steam supply open, releasing steam.

The hazards associated with these two events are discussed in the following sections.

5.1.1 Small Vessel Failure

The main consequences of a small vessel failure in the autoclave are the potential release of pathogens into the air, within the building. The consequences of a small vessel failure are considered in further detail in Section 6.2.

5.1.2 Vessel Failure

For a vessel failure to occur, steam needs to be at a pressure that could cause the autoclave chamber to rupture. This event is not considered to be credible as the steam supply has a safety valve to release excessive pressure by discharging steam from a pipeline located above the autoclave as soon as the pressure reaches 50 PSI.

The event occurring at high steam pressure would have already undertaken the destruction of pathogens and the majority of pathogens would be no longer available for release.

Although the event is not considered to be credible, in the interests of a rigorous assessment the consequences of a catastrophic vessel failure are considered in further detail in Section 6.2.

5.2 SPILL DURING TRANSPORT OPERATION

The main consequences of a spill during transport are the potential for the release of medical waste into the stormwater system. Currently medical and clinical waste is transported to the site in NSW EPA approved vehicles. This will continue with the proposed operations. In any case, a Transport Incident Management Strategy has been prepared in accordance with current NSW Government requirements.

6. CONSEQUENCE ESTIMATION

The consequences of an accident involving a particular hazardous substance depends on the type and quantity of hazardous substance, the type of activity using the substance as well as the exposed population.

A preliminary consequence analysis of the proposed medical waste facility has been conducted in accordance with the prescribed Multi-Level Assessment guidelines document provided by Planning NSW. Following is a summary of the consequence analysis results.

6.1 RISK CLASSIFICATION AND PRIORITISATION

The Department of Planning and Environment, NSW document Multi-Level Risk Assessment (1999) outlines a method of risk classification and prioritisation to assist in assessment of risk. The technique is based on the Manual for classification of risks due to major accidents in process and related industries (IAEA, 1993). The IAEA method was developed to produce a broad estimate of the risks due to major accidents from the manufacture, storage, handling and transport of hazardous materials. The technique involves three stages:

- Estimation of the consequences of a major accident;
- Estimation of the probability of a major accident happening; and
- Estimation of societal risk.

6.1.1 Estimation of Consequence in Terms of Potential Fatalities

The consequences of a major accident depend on the type of substance and activity and the quantity involved, as well as the exposed population. After excluding those substances and activities which neither present a significant off-site risk nor could potentially affect adjacent inventories, the following steps are undertaken:

- Classify the activity;
- Estimate the effect distance and area;
- Estimate the population distribution; and
- Consider Mitigation Correction Factors, which takes into account possible mitigatory actions that people could take, such as evacuation and sheltering.

An estimate of the external consequences of a major accident may be calculated using these factors.

6.1.2 Estimation of Probability of a Major Accident Happening

The method used for estimating probability is based on probability numbers related to the type of installation and hazardous substance used, together with the following probability correction factors:

- Frequency of loading/unloading operations;
- Provision of safety systems associated with the storage and handling of hazardous substances;
- A quantitative assessment of the management and safety levels of the organisation; and

- A quantitative assessment of the wind direction towards a populated area.

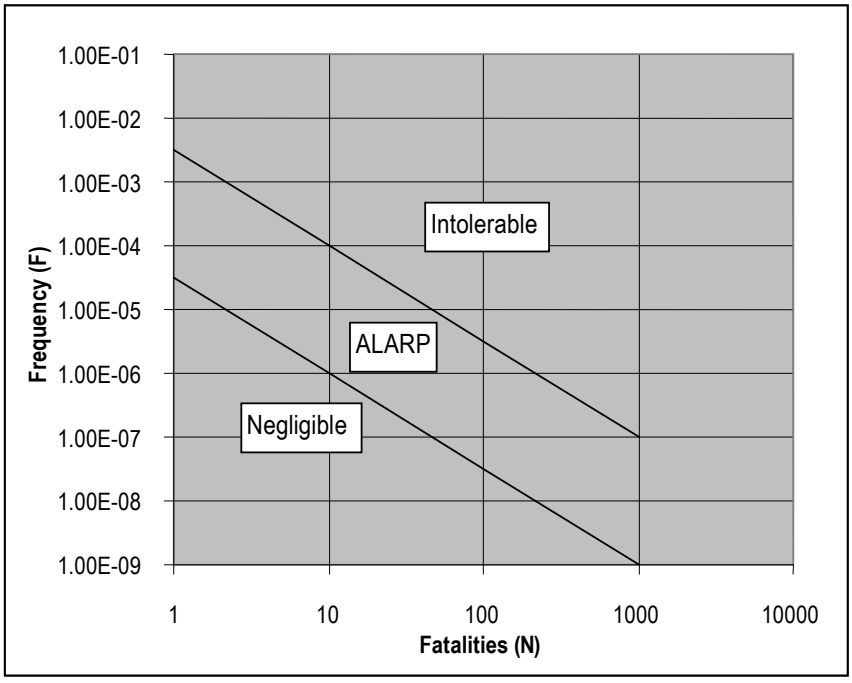
An estimate of the probability of major accident may be calculated using these factors.

6.1.3 Estimation of Societal Risk

At this stage, pairs of numbers have been calculated for each activity, comprising the number of fatalities per accident and expected frequency of the accident. The results may be transferred to a plot of frequency verses consequence (F-N curve) and a direct estimate of societal risk can be determined. The F-N curve used to classify societal risk is shown in Figure 6-1. The F-N curve is divided into three regions:

- Negligible - accidents are not considered to have significant off-site consequences;
- ALARP - while risk of an accident may be tolerable, steps should be taken to reduce the risk level to as low as reasonably possible (ALARP); and
- Intolerable - risk of an accident with the potential for significant off-site consequences is unacceptable.

Figure 6-1: IAEA F-N Curve



As the IAEA method does not present data for the treatment of clinical and related waste, the proposed operations of the site, the IAEA assessment method cannot be used for assessment of the proposed operations. Therefore a qualitative assessment of the consequences of the hazards identified in Section 5 will be conducted in the following sections.

6.2 VESSEL FAILURE INCIDENT SCENARIO

As detailed in Section 5, a release of pathogens into the air would only occur in the event of the autoclave vessel failing.

6.2.1 Vessel Failure

Extensive research has been conducted into the failure rates of pressure vessels. Lees Loss Prevention in the Process Industries 2nd Edition, gives a literature review of pressure vessel failure rates. Studies dating back to the 1960's and 70's calculate pressure vessel failure rates of between 10^{-5} and 10^{-3} failures per year, however more recent studies provide lower failure rates. The First Canvey Report (1978) gave values of between 10^{-5} and 10^{-4} and the Rijnmond Report (1982) gives failure rates between 10^{-6} and 10^{-5}. The more recent Rijnmond Report has been referenced for this assessment. Failure rates referenced are as follows:

Table 6-1: Pressure Vessel Failure Rates

Failure	Failure Rate (Failures/year)
Serious Leakage	1.0×10^{-5}

Pathogen release could only occur from a leak. As previously mentioned failure due to excessive pressure would result in a large release of energy, destroying the majority of pathogens that may be present. Using the above data, the frequency of a release of pathogens is 1.0×10^{-5} incidents per year. This is higher than the injury and irritation criteria for sensitive members of the community from toxic substances of 10×10^{-6} (10 in a million per year) and 50×10^{-6} (50 in a million per year) respectfully. Emergency shutdown systems and maintenance procedures would be implemented as a result of the development, and would further reduce the likelihood of a pathogen release. Detailed consequence estimation has been provided in further detail.

The frequency for a high pressure rupture is 1.0×10^{-6}, which is below the criteria for hazardous, commercial and residential areas. Consequence estimations will be conducted as due diligence.

6.3 RELEASE OF PATHOGENS

The air dispersion model, AERMOD was used for the prediction of off-site impacts associated with the potential release of pathogens from the proposed operations. AERMOD uses air dispersion based on planetary boundary layer turbulence structure and scaling concepts. The AERMOD model replaced AUSPLUME as the air dispersion model accepted by the Victorian EPA in January 2014 and is a suitable model to use for this assessment. This model is also accepted by the NSW EPA, and other Local and State Government Departments.

Each batch sterilisation the 4 bins may contain up to 2.2×10^{9} spores of pathogens prior to being placed in the autoclave. (*Evaluation of Potential Biological Emissions from Alternative Medical Waste Treatment Technologies*, July 1993, Research Triangle Institute, prepared for US EPA). Assumptions and emission rate calculations have been detailed below.

- The vessel failure occurs at the beginning of the cycle and no spores have been destroyed; The main access doorways happen by chance to be open as the autoclave fails. This assumption is modelled to illustrate the ground level concentrations under a scenario that can be readily prevented from occurring by keeping the closed doors. Failures of autoclaves are not reported in the literature and are known to be rare due to the nature of the business through their design, regular maintenance, and SafeWork NSW requirements.
- In the process spores would be destroyed so the analysis is very conservative so for this Scenario the autoclave would have to fail shortly after a cycle has occurred.
  How a failure of an autoclave would occur allowing the spores to be released is extremely unlikely given the design of autoclaves to pressure vessel standards.
  If a failure occurred, such as a weld crack or the door spring open, the release rate of the spores would be significantly less than the vent being modelled.
- No spores are destroyed after release into the air;
- Spores are initially released into the confines of the entire building where the autoclave is operating. This gives a spore concentration within the building of:

$$\text{Concentration} \quad \frac{\text{Number of Spores}}{\text{Building Volume}} \quad \frac{2.2 \times 10^{9} \text{spores}}{3493.7 \text{m}^3} \quad 6.3 \times 10^{5} \text{ spores/m}^3$$

The pathogens are released directly into the outside air from the two access doorways assuming the doors which are usually kept closed happen to be open. If, as under normal operating conditions, the doors are closed this would reduce the spores available to be released by typically 85%.

The area of each door is used to calculate the quantity of pathogens/spores that are likely to leave the building. The area of each door is 25 m^2. The velocity of the air leaving the building through the doors is 0.1 m/s. Hence, the flowrate through each door is 0.1 × 25 = 2.50 m^3/s. The concentration inside the building is 6.3 × 10^5 spores/m^3. Hence, the Emission rate through each door is 6.3 × 10^5 × 2.5 = 1,574,262 spores/s or 1.57×10^6 spores/s.

The air velocity at the doorways was assumed to be 0.1 m/s outwards.

The Building has been modelled as a volume source corresponding to release from two doorways. Hence the emission rate is 3.15×10^6 spores/s

The closest monitoring station to the subject site is the Horsley Park Equestrian Centre Automatic Weather Station (AWS) (Station No. 67119) operated by the Bureau of Meteorology (BoM). This monitoring station is located approximately 7.2 km south-south-west of the subject site. Data at this monitoring station are logged hourly and were used in accordance with the NSW EPA air dispersion modelling guidelines. The year selected for the assessment was 2015, which was the most complete and recent datasets available from the monitoring station that are compliant for use in the modelling in accordance with the NSW EPA guidelines. However, the meteorological data were then reviewed, revised for the specific site in accordance with the EPA's guidelines and approved to be used in the computer models by an expert meteorologist from Victoria (pDs Consultancy). Hence, all scenarios were modelled with site specific and real meteorological data as well as scenario specific data rather than assumed. Meteorological .SFC and .PFL files provided by the client based on Horsley Park 2015 data. Non-sequential Met Data option use. .SFC and .PFL files can be made available upon request.

The following nearest residential and industrial premises were considered as discrete receptors in the model.

Table 6-2: Discrete Receptors

Receptor ID	Address	Lot & DP	Approximate distance to site boundary (m)	Type of Receptor
R1	170 Reservoir Road Arndell Park	Lot 201 DP 880404	1,100 E	Residential
R2	61 Holbeche Road Blacktown	Lot 1 DP 832346	560 NE	Residential
R3	92 Aliberti Drive Blacktown	Lot 63 DP 869788	500 NE	Residential
R4	1 Mariko Place Blacktown	Lot 98 DP 869788	400 N	Residential
R5	52 De Castella Drive Blacktown	Lot 242 DP 842110	690 N	Residential
R6	15 Flemming Grove Doonside	Lot 10 DP 975002	1,140 NW	Residential
R7	711 Great Western Highway Eastern Creek	Lot 1 DP 723384	1,980 W	Residential
R8	47 Pikes Lane Eastern Creek	Lot 3E DP 436196	2,160 SW	Residential
R9	50 Peter Brock Drive Eastern Creek	Lot 4 DP 1079897	1,370 S	Recreational
R10	14 Kenoma Place Arndell Park	Lot 12 DP 786328	Immediately Surround Site NW	Industrial
R11	16 Kenoma Place Arndell Park	SP85841	Immediately Surround Site W	Industrial
R12	21 Lidco Street Arndell Park	Lot 221 DP 786329	Immediately Surround Site SW	Industrial
R13	23 Lidco Street Arndell Park	Lot 222 DP 786329	Immediately Surround Site S	Industrial
R14	25 Lidco Street Arndell Park	Lot 223 DP 786329	Immediately Surround Site SE	Industrial
R15	7 Kenoma Place Arndell Park	Lot 15 DP 786328	Immediately Surround Site NE	Industrial

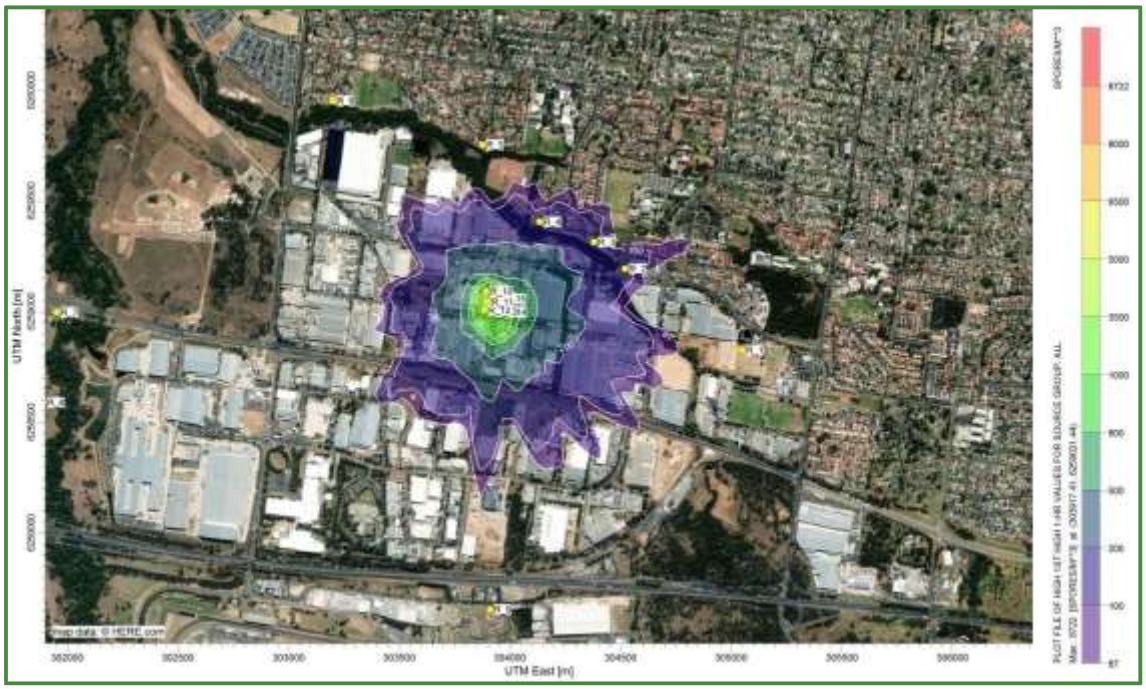
Emissions of pathogen were modelled over a 1 hr averaging period. If it were assumed a person breathes at approximately 30 L per minute, then in one hour a person would be exposed to the following pathogen levels:

Table 6-3: Predicted Pathogen Ground Level Concentrations and Hourly Exposure Levels

Receptor	Predicted Ground Level Concentration (spores/m3)*	Hourly Pathogen Exposure (spores)*
R1	67	120
R2	125	225
R3	113	203
R4	122	219
R5	55	98
R6	50	91
R7	23	41
R8	32	58
R9	50	91
R10	2156	3880
R11	5543	9978
R12	2446	4402
R13	3548	6387
R14	2884	5191
R15	5888	10599

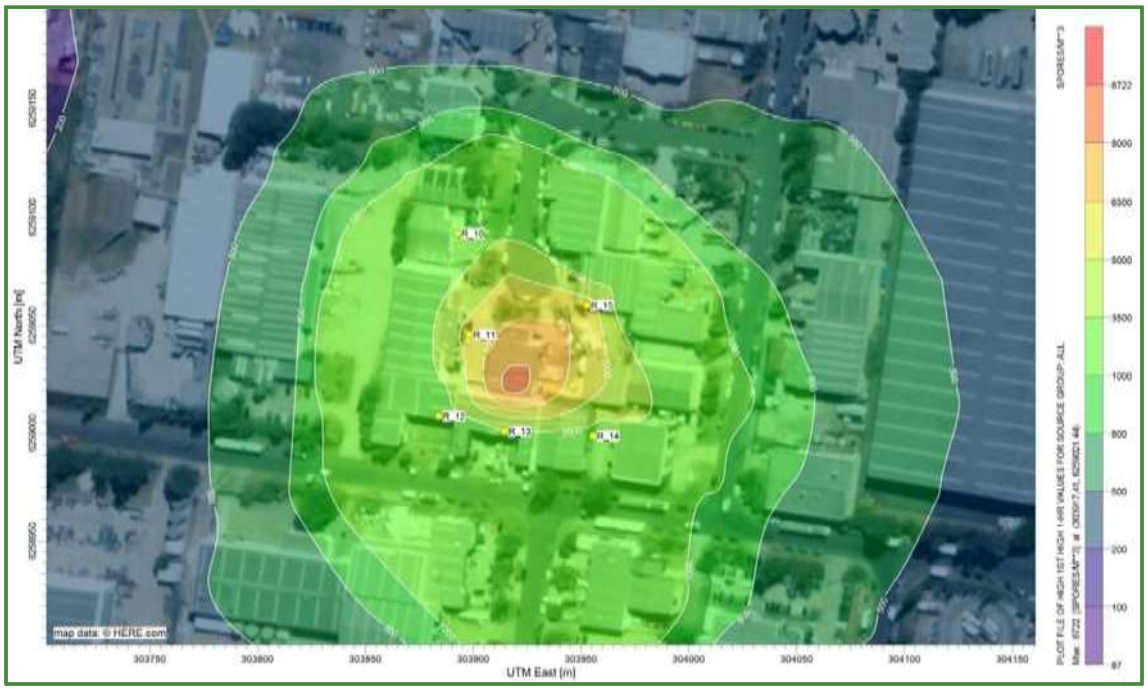
*Results rounded to nearest whole spore

Figure 6-2: Predicted Pathogen Ground Level Concentrations



The receivers R10-R15 are industrial premises. These premises would be immediately advised and therefore there would be no one present to be exposed for 1 hour. 10–15 minute exposure time from our experience would clear these premises.

Figure 6-3: Predicted Pathogen Ground Level Concentrations Close-Up of Industrial Receptors



The infectious dose for air borne pathogens is the number of organisms that must deposit at an appropriate site in the lungs in an appropriate time interval to initiate infection. The infectious dose depends on the pathogen, the time exposed and the individual person. Published data on infectious doses for pathogens is not widely available. Data was obtained for the infectious dose of air borne anthrax (*Bacillus anthracis)* and was reported to be between 4,000 and 55,000 spores with a mean of 10,000 spores (Hubbard and Nicas, AIHA Journal 2003).

The maximum of pathogen exposure at the nearest identified receptors over a one hour period would be 10,599. Reducing the length of exposure to a more realistic period of 10–15 minutes would proportionally reduce the maximum pathogen exposure to below the mean of 10,000 spores.

The model scenario is bordering on being not credible and given the extremely conservative nature of this scenario, the many other PHAs on autoclaves prepared by Benbow Environmental have been approved after review by the Department without being questioned. This may be due to a lack of understanding of the operations of an autoclave and hazard analysis.

It should be noted that the modelling was conservatively conducted based on the worst case conditions.

6.4 Pressure Explosion

An explosion incident involving high pressure steam in the autoclave is not considered to be a credible event. To provide further assurances about the low level risk of this process, the release of steam has been modelled using a TNT equivalent explosion model. The TNT explosion model used is the Kingery and Bulmash model as outlined in Section 17.26.2 of Lees' *Loss Prevention in the Process Industries*.

Autoclave volume is 10,400 l, operating temperature is between 134-140°C and operating pressure is 45 PSI (310 KPa).

The autoclave will operate with steam at a temperature of 134-140°C, a pressure of 45 psi (310 kPa) and a volume of approximately 10,400 L, the total energy of the steam will be estimated using the Brode equation:

$$E_{Br} = \frac{(P_1 - P_0)V}{\gamma_1 - 1} = \frac{(310{,}000 - 101{,}325)(10.4)}{1.4 - 1} = 3.02 \times 10^7 \text{ J} = 7.21 \times 10^6 \text{ cal}$$

where E_{Br} = energy of explosion (J), P = pressure (Pa), V = volume (m^3), γ = ratio of specific heats (1.4 for ideal gases) and subscript 1 relates to initial vessel conditions and 0 atmospheric conditions.

TNT has energy of explosion of 1,120 cal/g, therefore the autoclave vessel has an equivalent explosive energy of:

$$W = \frac{1.3 \times 10^6}{1{,}120} = 1{,}155 \text{ equivalent g of TNT} = 1.2 \text{ equivalent kg of TNT}$$

The scaled distance (z) used in the TNT explosion model is equal to:

$$z = \frac{R}{W^{1/3}}$$

where R = radial distance (m) and W = mass of TNT (kg)

Using the scaled distances calculated above and the correlation constants for a surface blast for the Kingery and Bulmash model listed in Figure 17.59b of Lees, the following peak overpressure distances are calculated:

Table 6-4: Distance to Overpressure

Pressure Level (kPa)	Distance (m)
7	17

The peak overpressure level of 7 kPa would not affect the nearest residential areas located 280 m from the site and would not affect adjoining industrial premises that are further distant to the autoclave than the 17 m distance at which 7 kPa overpressure may occur. Therefore there is negligible risk to residential areas and given that the event is prevented from occurring by safeguards, there is negligible risk to the surrounding commercial/industrial properties.

7. REVIEW OF FIRE SAFETY REQUIREMENTS

This section presents a review of the fire safety issues associated with the proposed development in accordance with the relevant Australian/New Zealand Standards and the Building Code of Australia (BCA) requirements.

7.1 DEVELOPMENT CHARACTERISTICS

The particular characteristics of the proposed development that should be considered in the assessment and management of a potential fire threat associated with the operation of the site are the following:

- Handling of clinical and related waste products.

7.2 REVIEW OF FIRE PREVENTION/PROTECTION STRATEGY

Following is a review of the fire prevention and protection measures to be implemented at the site to ensure that the proposed development complies with the relevant Australian Standards and the Performance Requirements of the Building Code of Australia (2013).

The building is used for the processing of waste, therefore the building is classified as a Class 8 building in accordance with Section A3.2 of the BCA. The building also contains an office/administration and amenities area, this part of the building would be classified as a Class 5 building.

7.2.1 Spillage Control

The site is currently bunded to contain any spill and contaminated firewater that would be present during a fire event. Some spills may drain to the site's stormwater system, which is to be fitted with an isolation valve to prevent contaminated release.

7.2.2 Security and Signage

The building would be securely locked from unauthorised access outside operating hours. Relevant signs and notices shall be displayed at each entry point to the building in accordance with the respective Australian/New Zealand Standards, Occupation Health and Safety Regulation (2005), The Australian Dangerous Good Code and the NSW Health and NHMRC guidelines.

7.2.3 Provision for Escape

Provision for escape during the event of a fire must be in accordance with D1 of the BCA. Exist travel distances readily satisfy with the requirements of Clause D1.4 of the deemed-to-satisfy (DTS) provisions of the BCA. Illuminated exist signs will be installed above or adjacent to exit doors and in appropriate positions indicating the direction to an exit. The exit signs will be designed and installed to comply with AS 2293.1.

7.2.4 Fire Detection

The main system for fire detection would be the staff on the site as they would be able to quickly detect any fires via visual or odour recognition. Once such situations are detected appropriate *first response* action would be taken.

7.2.5 Fire Protection Equipment

The site building has a floor area of approximately 2915 m^2 therefore a hose reel system is installed on site. No hydrants are installed on site, but existing street hydrants are provided.

7.2.6 Emergency Response Plan

An emergency response plan would need to be developed to include the proposed Autoclave operations.

7.3 CONTAINMENT OF CONTAMINATED FIRE FIGHTING WATER

The methodology for calculating the amount of contaminated fire-fighting water to be contained and the methodology of containment follow the recommendations in the document HIPAP No. 2 – Fire Safety Study Guidelines (DUAP 1993) and the Best Practice Guidelines for Containment Water Retention and Treatment Systems (HMPCC 1994).

7.3.1 Identification of Materials and Hazards

The principle potential hazard that could occur on the site that would produce contaminated water would be a fire. It is expected that the firewater used to fight or contain a fire would be become contaminated with some of the hazardous materials that are kept at the site.

During a fire event it is expected that depending on the location and extent of the fire, part of these hazardous materials would be contaminated and that some would be spilt as a result of containers failing due to thermal stress. These spilt hazardous liquids would therefore contaminate the spent firewater.

7.3.2 Estimation of Potential Contaminated Firewater Volume

A worst-case fire on the site has been used to calculate the maximum amount of contaminated firewater. This would involve a fire consuming an entire building. The fire services available at the site are:

- 2 hose reels.

No fire hydrants exist on site. The building compartments on site have a total floor area of approximately 600 m^2. The minimum required fire hydrants for a building of this size is one (1) hydrant. Street hydrants are provided for hydrant fire-fighting water. Thus the discharge of these for 90 minutes will be equal to:

Table 7-1: Containment of Contaminated Firewater

Total Containment Required	
Hose reels Operational discharge of 0.45 L/s 0.45 L/s × 60 s/min × 90 min = 2,430 L 2 × 2,430 L = 21,870 L	4,860 L
Fire Hydrants Operational discharge of 10 L/s 10 L/s × 60 s/min × 90 min. = 54,000 L 1 × 54,000 L = 54,000 L	54,000 L
Total firewater containment required	**58,860 L**

7.3.3 Firewater Containment System

Current bunding provided at local process points and around buildings needs to be assessed and modified to contain 58,860 L of firewater as calculated above.

7.3.4 Consequences of Contaminated Firewater

If no system were in place to contain used firewater then it would flow off site and could enter local waterways. If the water was contaminated with significant levels of hazardous materials, there is the potential for an impact on the waterways.

8. ENVIRONMENTAL SAFEGUARD PROCEDURES

The current operations of the site include extensive environmental safeguard procedures. Additional procedures and updating of current procedures will need to be conducted to include the proposed Autoclave operations as part of an extensive Environmental, Health and Safety Management System. All employees will be trained in the environmental safeguard procedures. The following safeguard procedures will be updated or developed for the site, if considered necessary for this relatively small facility.

- Transport Procedure;
- Hygiene Procedure;
- Disposal Procedure;
- Sharps Injury Procedure;
- Bin and Container Cleaning Procedure;
- Handling of Chemicals Procedure;
- Cytotoxic Waste Handling Procedure;
- Autoclave Operation Procedure;
- Autoclave Emergency Shutdown Procedure;
- Autoclave Maintenance Procedure;
- Preventative Maintenance Program;
- Emergency Plan and Procedures;
  The emergency plan would also need to include notification to surrounding industries, so the evacuation procedures can be implemented at these premises.
- Evacuation Procedure;
- Incident Reporting Procedure;
- Non – compliance and Corrective Action Report Procedure; and
- Change Management Procedure.

9. SUMMARY OF RECOMMENDATIONS

The following recommendations that have been made throughout this report have been summarised here for easy reference:

- The transport and handling of clinical and related waste be in accordance with the following guidelines:
  - AS/NZS 3816:1998 Management of clinical and related wastes (Standards Australia);
  - Australian Dangerous Goods Code (ADGC);
  - Waste Management Guidelines for Health Care Facilities (NSW Health, August 1998); and
  - National Guidelines for Waste Management in the Health Care Industry (National Health and Medical Research Council (NHMRC), March 1999).

The following safeguard procedures be updated or developed for the site if considered necessary for this relatively small facility:

- Traffic Flow and Transport Procedure;
- Hygiene Procedure;
- Disposal Procedure;
- Spill Procedure;
- Sharps Injury Procedure;
- Bin and Container Cleaning Procedure;
- Handling of Chemicals Procedure;
- Cytotoxic Waste Handling Procedure;
- Autoclave Operation Procedure;
- Autoclave Emergency Shutdown Procedure;
- Autoclave Maintenance Procedure;
- Preventative Maintenance Program;
- Emergency Plan and Procedures;
  It is recommended that the emergency procedure include surrounding premises. In the event of a major vessel failure, notification to these surrounding premises as well as relevant regulatory authorities (e.g. Fire Brigade, Police, EPA) would occur so that necessary prevention or evacuation procedures can be undertaken.
- Evacuation Procedure;
- Incident Reporting Procedure;
- Non-compliance and Corrective Action Report Procedure; and
- Change Management Procedure.

- All employees are trained in the Environmental Safeguard Procedures;

- All employees are provided with appropriate personal protective equipment;

- Current bunding provided at local process points and around buildings needs to be assessed and modified to contain 58,860 L of firewater as determined previously.

- All unloading operations be conducted within the building.

10. CONCLUSIONS

The Preliminary Hazard Analysis has found that the operation of the proposed development meets the criteria laid down in HIPAP 4 *Risk Criteria for Land Use Safety Planning* and would not cause any risk, significant or minor, to the community. Furthermore, the site's proposed operations are not an offensive or hazardous industry based on applying the Department of Planning and Environment guidelines.

It is the conclusion of this PHA that the proposed development meets all the safety requirements stipulated by Department of Planning and Environment and would not be considered to be an offensive or hazardous development.

This concludes the report.

Nicolas Israel
National Integrated Creative Solutions

[redacted]

R T Benbow
Principal Consultant

11. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for Preliminary Hazards Analyses. No guarantees are either expressed or implied.

This report has been prepared solely for the use of State Waste Services, as per our agreement for providing environmental services. Only State Waste Services is entitled to rely upon the findings in the report within the scope of work described in this report. Otherwise, no responsibility is accepted for the use of any part of the report by another in any other context or for any other purpose.

Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that otherwise required by law) in relation to any of the information contained within this document. We accept no responsibility for the accuracy of any data or information provided to us by State Waste Services for the purposes of preparing this report.

Any opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal advice.

12. REFERENCES

Australian/New Zealand Standard AS/NZS 3816:1998 *Management of clinical and related wastes* Standards Australia/New Zealand

Batstone, R.J. and Tomi, D.T. "Hazard Analysis in Planning Industrial Developments" *Loss Prevention*, 13, 7, 1980.

Cole, E., Leese, K. and Hall, R. *Evaluation of Potential Biological Emissions from Alternative Medical Waste Treatment Technologies*, Research Triangle Institute, prepared for Office of Solid Waste, US EPA, July 1993

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DPE2011 *Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis* Department of Planning and Environment, Sydney 2011

DPI 2011 *Multi-Level Risk Assessment* Department of Planning & Infrastructure, Sydney 2011

FCRCL 1996 *Fire Engineering Guidelines* Fire Code Reform Centre Limited, Sydney 1996

HMPCC 1994 *Best Practice Guidelines for Contaminated Water Retention and Treatment Systems* Hazardous Materials Policy Co-ordinating Committee, July 1994

Lees, F.P. 1996 *Loss Prevention in the Process Industries – Hazard Identification, Assessment and Control* 2nd Edition, Butterworth-Heinemann, Great Britain 1996.

Lewis, S.R. *Sax's Dangerous Properties of Industrial Materials* 9th Edition, Van Nostrand Reinhold, United Stated of America 1996

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NSW Legislation Environmental Planning and Assessment Act 1979

NSW Legislation Environmental Planning and Assessment Regulation 2000

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Perry, R.H. and Green, D.W. 1997 *Perry's Chemical Engineers' Handbook* 7th Edition, McGraw-Hill Book Co, Japan 1997

Smith, D.J. *Reliability and Maintainability in Perspective* 2nd and 3rd Edition, Macmillian, London, 1985

TNO 1997 *Methods for the Calculation of Physical Effects – due to releases of hazardous materials (liquids and gases) 'Yellow Book'* 3rd Edition, Committee for the Prevention of Disasters, The Hague 1997

TNO 1998 *Methods for Determining and Processing Probabilities Committee for the Prevention of Disasters caused by Dangerous Substances 'Green Book'* 1st Edition, The Hague 1988.

ATTACHMENTS

Attachment 1: Autoclave specification

1278 Highway 461
Somerset, KY 42503
Direct Line: 305-668-8650
Corp. Office: 800-414-4231
Corp. Fax: 606-676-9157

May 1, 2012 R1
April 28, 2012

Chris Liney
Managing Director
State Waste Services (NSW) Pty Ltd
P: +61 (0)2 98942828 **F:** +61 (0)2 98947809 **M:** +61 (0)448484848 **W:** www.statewaste.com.au

Subject: **Proposal Bondtech Autoclave Sterilization: BTT6X13**

Dear Chris,

We thank you for the opportunity to be a part of your comprehensive plan for the treatment and disposal of regulated medical waste.

Bondtech has been involved with the custom design, engineering, installation, manufacturing and maintenance of autoclave/sterilizer technology since 1983. Our systems have been installed nationally and internationally for processes such as aerospace composite structures, medical waste sterilization, rubber vulcanization, textile setting, glass lamination, wood treatment and others. ***Bondtech*** is the world's largest manufacturer of commercial medical waste autoclaves.

Bondtech autoclave systems. Each ***Bondtech*** autoclave system includes a hydraulic lift table to provide an extra safety feature for loading and off-loading. The ***Bondtech*** biomedical waste systems are the best known, and most reliable medical waste systems in the commercial arena. Our carts will be sized so that you can maximize your capacity.

We understand that when treating medical waste in-house you must have a dependable piece of equipment, therefore, we have addressed the following areas:

Customer On-line Support: ***Bondtech's*** autoclaves will include a PLC (Programmable logic controller) with a modem hookup capability upon request. Our technicians are capable of troubleshooting the autoclave system over the standard phone line.

Testing: ***Bondtech's*** autoclaves are fully tested at our shop prior to shipment. Our customers are encouraged to witness these tests and receive free training.

Validation Testing and Engineering: We will provide you with validation testing procedures and engineering design for your installation.

YoRQGMHIs systems provide the following advantages:

No shredding prior treatment:

- > ***No potential aerosilization of pathogens***
- > ***No bloodborne pathogen exposure to maintenance personnel***
- > ***Minimizes occupational exposure***

High Vacuum System:

- > ***Ensures effective medical waste treatment***
- > ***Minimizes occupational exposure***
- > ***No residual steam exposure after waste treatment***
- > ***Effectively controls nuisance odors***

High pressure/temperature:

- > ***Ensures effective medical waste treatment***

Reliable Proven Technology:

- > ***Largest company providing commercial med-waste systems***
- > ***Systems operating throughout the U.S. and abroad***
- > ***Environmentally tested since 1983***

Simple and Safe System:

- > ***Safe Operation.***
- > ***NO personnel contact with infectious medical waste.***
- > ***NO personnel contact with sterilized medical waste.***
- > ***Minimal moving parts.***
- > ***Single Pushbutton ± Automated System.***

Experience: ***Bondtech*** has been involved with the custom design, engineering, installation, manufacturing and maintenance of autoclave/sterilizing technology since 1983. ***Bondtech*** is the world's manufacturer and provider of autoclave systems to the commercial medical waste industry. Our customer's include, Stericycle (USA, Canada, Mexico, Puerto Rico, Argentina, UK), Waste Management (USA), Daniels International (USA, UK, Canada), Compass Waste (South Africa), HES (UK), EraCevre (Turkey), Waste Industries (Puerto Rico), Sterimed (Mexico), Wekaya Environmental (UAE), Saudi Environmental (Saudi Arabia), Hamad Medical Corporation (Qatar), EcoCapital (Colombia), Gaderes (Ecuador), SteriMed (Costa Rica), Central Queensland Port Authority (Australia) and many more.

Please review our proposal and do not hesitate contacting us with any questions you may have. Thank you for your interest, and we look forward to hearing from you.

Sincerely yours,

Angel Aguiar

Angel Aguiar, P.E.
Vice President

PROPOSAL FOR:

MEDICAL WASTE AUTOCLAVE SYSTEM

BY:
BONDTECH CORPORATION

PROPOSAL INCLUDES:
THE MANUFACTURING/PROCUREMENT, TESTING OF
AUTOCLAVE STERILIZATION EQUIPMENT

May 1, 2012 R1
April 28, 2012

1.1.0 ***BONDTECH*** **AUTOCLAVE/STERILIZER SYSTEM SPECIFICATIONS**

High vacuum/High pressure, Computer controlled, Bondtech autoclave system to treat biomedical waste on-site

1.1.1 AUTOCLAVE DIMENSIONS AND CAPACITY

BTT6X13
6' dia X 13' long
Pressure Grade Carbon Steel
Number of bins: 3 or 4/per load
Capacity: ~ 500 to 600 kg/cycle (@ standard Med Waste density of 5.5 lb/cuft)
~ 750 to 850 kg/cycle (Port Waste)

1.1.2 AUTOCLAVE VESSEL SPECIFICATIONS

Opening Assembly: Single door/quick opening door/safety pin interlock
Loading Arrangement: Horizontal
Pressure Vent: Spray condenser

1.1.3 INSULATION

The exterior of the autoclave will be insulated with 2" of fiberglass, which will be covered with an aluminum jacket to protect the insulation, and to make sure the equipment can be kept clean.

1.1.4 PROCESS VALVES

Complete with the process valves including steam supply, pressure vent and safety relief.
The steam inlet valve is a ***high-resolution pneumatic proportional valve for a smooth accurate control of steam pressure***. For safety, the steam inlet valve is a normally closed valve that closes in the event of any power loss.

1.1.5 AUTOCLAVE VESSEL DESIGN

The autoclave vessel is designed, fabricated, tested and certified in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, for Unfired Pressure Vessels. The vessel is designed for full vacuum. The sterilization unit is formed and welded into a horizontal cylindrical pressure vessel with a hydraulic quick opening door. The vessel includes two rigid support saddles to facilitate a simple installation. The front face of the
vessel has a machine groove for the rigid high temperature seal gasket.

1.1.6 VACUUM SYSTEM.

Vacuum: Vacuum: 24-28" Hg.
High Efficiency Vacuum System

Vacuum Capability: 24"-28" Hg, 3 minutes

Pre-vacuum: The pre-vacuum process will evacuate the autoclave 24"-28" Hg. This process will achieve the removal of air from the autoclave to provide a quick and efficient penetration of steam throughout the medical waste load.

Post-vacuum: The post-vacuum process removes excess steam from the vessel and expedites the steam purging process. This process removes excess moisture from waste load resulting in a lighter/drier treated waste product for disposal. Moisture removal effectively controls nuisance odors.

1.1.7 STEAM CONDENSER

Independent steam condenser manufactured of pressure-grade steel. The condenser is designed for quick and efficient steam purge from the autoclave vessel. Process steam is fully condensed externally to the autoclave vessel. ***Steam purge process is completed within approx 2-3 minutes.***

1.1.8 DOOR OPERATION, SEALING AND LOCKING MECHANISM

The door is hinged mounted on the autoclave. Mounting arrangements to provide full movement to a full open position. Preferred sealing system to utilize one-piece extruded material O-ring seal type. The door has a positive lock type safety design per the ASME requirements. The locking mechanism is interlocked with the control system to prevent opening the door while under pressure, and to prevent pressurization when the door is unlocked. The door is designed with several safety features that include electric/mechanical interlock switch, PLC interlock, door safety handle interlock, visual site gauge for pressure monitor and analog dial pressure/temperature indicators.

1.1.9 MATERIAL HANDLING

Autoclave tracks will be provided for the autoclave bins.
Optional automatic hydraulic Lift Table for assisting in loading/unloading bins

1.1.10 SYSTEM PIPING.

The autoclave system will completely piped at the factory prior to shipment for simple installation. The system piping will consist ofthe following:

- Steam condenser piping – steam outlet piping direct to steam condenser. Steam is condensed by controlling water flow through the steam condenser with respect to steam pressure inside the vessel. The water flow control minimizes the consumption of water.
- Condensate Drains Steam traps (2) – front and rear steam traps maintains the vessel free of condensate.
- Vacuum Valve/Piping – autoclave is hard piped to either steam ejector or vacuum pump for integrating vacuum system to vessel.
- Steam Inlet Valve/Strainer – proportionally controlled steam inlet valve for smooth and accurate control of steam pressure inlet. Steam inlet valve is controlled by a PID loop controlled by the PLC.

1.1.11 CONTROL SYSTEM/PROCESS VALVES/CONTROL PANEL & INSTRUMENTATION

The autoclave control panel is package in a NEMA 12 rated panel. The autoclave system is controlled by a state-of-the-art “SuperMicro” Programmable Logic Controller (PLC) with modem hookup capabilities for online support. The PLC performs automatic sterilization control control that includes pre-vacuum, pressurization/heat soak, vent and post-vacuum. The PLC monitors pressure vessel conditions for providing safety interlock for door operation.

1.1.12.1 SUPERMICRO PROGRAMMABLE LOGIC CONTROLLER (PLC).

The FX2N Series PLC provides the function controls that automatically commands the process cycle steps for the autoclave system. Extensive data memory (over 8,000 Data Registers) for capturing real time operating parameters that continuously monitors autoclave system performance.

The FX2N Series PLC support on-line troubleshooting/programming functions, used in system development and commissioning. Remote programming/monitoring capability by modem provides for immediate technician support. This PLC system has the external data link integration capability for communication with other peripheral systems (PC, network, control systems, etc).

Powerful features include:

- Windows Programming - Use Ladder, List or SFC languages.
- Operator Interfaces – Flexible selection to match specific customer application
- Extensive Program Memory – 8,000/16,000 steps
- Extensive Data Memory – 8000 Data Registers
- Enhanced Program Throughput – 80 nanoseconds/step
- Enhanced Process Control – Auto-Tuning, PID loop
- High-Speed Processing–60KHz counters, 10ms timed&50us hardware interrupts
- Embedded Motion Control – 20,000 hz pulse train, Trapezoidal ramp instructions
- High Function Math – 32 bit floating point, Square Root, Trigonometry
- Year 2000 Compliant – Y2K Compliant, 4 digit year
- Real Time Clock/Date – For scheduling date and time stamping
- Flexible Configurations – From 16 to 256 I/O & extensive special function I/O capabilities
- Communications – Built-in 2nd port (RS-232/RS422/RS485) & PLC-PLC networking
- Open Network Connectivity – Modules for Profibus DP, Profibus DP I/O, AS-I & CC Link

1.1.12.2 SYSTEM PROGRAMMING

PLC program application is based on the industry standard ladder logic. Programming can be performed by authorized personnel with access to system entry code.

Simple pushbutton entry pad allows the authorized personnel to enter specific parameters including the following:

- Pre-Vacuum Set Point
- Pre-Vacuum Timer
- Sterilization Temperature/Pressure
- Sterilization Heat Soak Time
- Vent Time Set Control
- Post-Vacuum Set Point
- Post-Vacuum Timer

In addition to the above, specific alarms are setup for triggering equipment shutdown and notifying the operator in the event that temperature and/or pressure parameters are not satisfied.

The startup program will be installed and tested by Bondtech technicians during startup.

1.1.13 CONTROL SYSTEM PRINTER - Honeywell Circular Chart Recorder

The control system printer is a state of the art Honeywell printer. The printer generates continuous data that provides the history of every autoclave cycle.

The Honeywell 4500 series printer will record and generate chart data that includes the following:

- Time and Date of every autoclave cycle.
- Cycle Start and Cycle End Time.
- Continuous Cycle Vacuum & Pressure
- Continuous Cycle Temperature

2.0 BONDTECH SHREDDING SYSTEM - HIGH VOLUME

Feed Material - General Autoclaved Medical Waste composed of plastic films, plastics containers, plastic tubing, cloth, glass, light gage steel medical sharps (scalpels, scissors, syringes etc)

Feed Method - By bin tipper. Materials delivered by Bondtech Autoclave Bin

Discharge Method - To customer supplied compactor or collection container

Throughput Rate **- BTT/MM-70 - shredder rated to accept 3000 lbs. per hour**

Shred Size - Approx. 1" wide x 4" to 8" lengths.

2.1 BTT/MM-70E SHREDDER

Cutting Chamber - 29" x 52"

– Two hexagonal, counter rotating shafts (5.2")

Knives - Shaft center distance: 9-7/16"

– Number of knives: 48 - Approx

- Knife width: 1.5" (39 mm)

– Knife diameter: 14.4"

– **# of teeth per knife: Two, offset hex for quick materials capture**

– Knife material: Heat-treated alloy steel

– Contoured cleaning fingers and hex bore spacers between knives

Drive System **- 60 HP, 3 phase**

– Planetary Gear Reducer

Fast/Slow Shaft Speed **- 21 / 17 rpm**

Maximum Tooth Force **- 54, 600 lbs.**

Maximum Torque **- 32,700 ft-lbs.**

SEAL SYSTEM **- Special Configured for Medical Waste**

2.2 **SUPPORT STAND** - 6" wide flange construction

– 60" discharge height

– Designed to clear customer's compactor/discharge container

2.3 BTT/MM-70E FEED ASSIST <u>HYDRAULIC</u> RAM HOPPER

– A-36 Plate - Reinforced plate construction

– Ram opening 33" x 66" approx.

– **Hydraulic cylinder** clevis mounted to heavy-duty ram platen

– Guide Mechanism – Guide Rollers

2.4 **CONTROL PANEL** - NEMA 4 enclosure/Keyed power switch

– Illuminated function buttons for shredder operation

– Circuit Breaker w/lockable door operating mech.

– Full Voltage, across-the-line, magnetic motor starters

– Control power transformer – 24 VDC

– Allen Bradley Programmable logic controller-system op.& monitoring

– Run time hour meter/Emergency Stop Button

2.5 HYDRAULIC CART TIPPER - NO TIPPER

TIPPING WILL BE PERFORMED BY FORK LIFT SYSTEM.

3.0 Start-up/Testing/Training.

The Bondtech start-up supervision will include the following:

Bondtech Start-up supervision, Operator Training & Equipment Documentation.

Bondtech will conduct classroom and "hands-on" training sessions The Bondtech training program will focus: 1. Safe Operation, 2. Compliance & 3. System Maintenance. Bondtech will provide a comprehensive training program thatincludes the following.

a. ***Bondtech SOP. Bondtech will develop a Standard Operation Procedure (SOP) specific for customer's operation. The SOP will address compliance with State Environmental Agency's medical waste treatment regulations.***

b. ***Bondtech Personnel Classroom Training. Bondtech will perform a classroom type training session. Personnel will receive his/her own copy of the Bondtech medical waste sterilization SOP. After the classroom training is completed, all trained personnel will execute a SOP Training Certification Form.***

c. ***Bondtech Equipment Operation Training. After the classroom SOP training, Bondtech will conduct a comprehensive equipment operation & maintenance "hands-on" training session.***

d. ***Bondtech Operation and Maintenance Manuals.***
Bondtech will provide two copies (three ring binders) of the Bondtech Operation and Maintenance (O&M) manuals. The O&M manuals will include complete installation drawings, parts/components properly identified and electrical/control wiring schematics.

4.1 AUTOCLAVE PRICE

Bondtech Autoclave System: Model BTT6X13	**Unit Price**	**Extended Price**
1.1 One (1), BTT 6' Dia. X 13' long; 75psig/FV *Bondtech* autoclave sterilization control system , Includes the BTT proprietary steam ejector vacuum system (Note B), Includes barometric steam condenser. Thruput ~ 1,200 # /hour (600 kg) Cycle Time ~ 50 min (load to load) Installation Support Service Included.	**$ 181,000.00 (1)**	**$ 181,000.00**

SUB TOTAL: $ 181,000.00
Discount (NOTE A): ($ 11,000.00)
GRAND TOTAL: $ 170,000.00

NOTE A: DISCOUNT IS FOR EXISTING COMPLETED NEW BTT6X13.
DISOUNT ONLY APPLIES IF ORDER AND DOWN PAYMENT IS RECEIVED BY MAY 2, 2012

NOTE B: BTT6X13 has the multiple vacuum capability.
Multiple vacuum was required to certify the BTT5X12 system installed in the Central Queensland Port Authority (CPQA) for the Port Waste.

NOTE C: BTT6X13 will have the required Australian Pressure Vessel Registration.

AUTOCLAVED OPTIONS:

A. Autoclave Bins (4) Stainless Steel (3 Load Configuration) Bin Capacity ~ (55inX36inX42in) ~ 48.12 cu ft / bin ~ 1.36 m^3 X 4 Bins/cycle Cycle Capacity ~ 5.5 m^3 /Cycle	$ 3,950.00 (3)	$ 11,850.00
B. Autoclave Bins (3) - Stainless Steel (4 Load Configuration) **Bin Capacity ~ (55inX48inX42in) ~ 64.14 cu ft / bin ~ 1.82 m^3 X 3 Bins/cycle** **Cycle Capacity ~ 5.5 m^3 /Cycle**	**$ 3,700.00 (4)**	**$ 14,800.00**
(1)	**$ 7,500.00 (1)**	**$ 7,500.00**
load/unload of autoclave. Not required if using a fork lift load/unload. ***Customer supplied fork lift will load/unload autoclave.***		
D. On-Site Startup/Training/Installation **Up to 4 Days on-site supervision/startup/training,** **Includes travel related expenses.** **Not Included:Customer is responsible for local transportation&hotel expenses.**	**$ 11,500.00 (1)**	**$ 11,500.00**

LEAD TIME: 1 to 2 weeks PRICE Valid until May 2nd.
TERMS: 40% Down
60% Prior To Ship (Wire transfer or LC Irrevocable & Confirmed through US BANK)

4.2 SHREDDER PRICE

BTT/MM-70 Single Stage Shredding w/Hyd Ram System – specs herewith NO TIPPER – Tipper will be performed by customer supplied fork lift.	**$ 150,900.00 (1)**	**$ 150,900.00**
On-Site Startup/Training Inland USA Freight + Freight to Guatemala – Port of Entry. Up to 4 Days on-site supervision/startup/training, ** Customer is responsible for local related expenses (hotel, local transport, meals)	**NO CHARGE (to be performed with autoclave system)**	**NO CHARGE (to be performed with autoclave system)**

LEAD TIME: 12 Weeks
TERMS: 40% Down
60% Prior To Ship (Wire transfer or LC Irrevocable & Confirmed through US BANK)

4.1 WARRANTY

Bondtech warrants that the equipment supplied when operated and maintained by competent personnel and in accordance with the instructions, and provided that the customer has made no alterations to the system, then Bondtech shall guarantee the autoclave vessel for one (1) year. On all other parts and accessories, Bondtech shall guarantee for one year and pass on the guarantees for the individual components. Seller will correct or replace any of said defective machinery equipment, or components provided buyer gives seller written notice during the above mentioned period.

BY: **May 1, 2012**
Angel Aguiar, PE
Vice President
Bondtech Corporation

Operation of Autoclaves

Introduction

The sterilization of materials using steam and pressure is a dependable procedure for the destruction of all forms of microbial life. However, the autoclave must be properly used and understood to be effective. Do not assume that merely pushing the button on an autoclave will result in the proper sterilization of your materials.

Why is it called an autoclave?

Because it describes a device that automatically locks shut when the pressure rises (to avoid steam spraying out if you open it by accident). The word is French, and comes from the Greek "auto" for automatic and the Latin "clvis," for key (as in lock and key).

Theory of operation

The Basics

Why is an autoclave such an effective sterilizer?

An autoclave is a large pressure cooker; it operates by using steam under pressure as the sterilizing agent. High pressures enable steam to reach high temperatures, thus increasing its heat content and killing power. Most of the heating power of steam comes from its **latent heat of vaporization**. This is the amount of heat required to convert boiling water to steam. This amount of heat is large compared to that required to make water hot. For example, it takes **80** Kilo calories to make 1 liter of water boil, but **540** Kilo calories to convert that 1 liter of boiling water to steam. Therefore, steam at 100 Deg. C has almost seven times more heat than boiling water. Steam is able to penetrate objects with cooler temperatures because once the steam contacts a cooler surface, it immediately condenses to water, producing a concomitant 1,870 fold decrease in steam volume. This creates negative pressure at the point of condensation and draws more steam to the area. Condensation continues so long as the temperature of the condensing surface is less than that of steam; once temperatures equilibrate, a saturated steam environment is formed. Achieving high and even moisture content in the steam-air environment is important for effective autoclaving. The ability of air to carry heat is directly related to the amount of moisture present in the air. The more moisture present, the more heat can be carried, so steam is one of the most effective carriers of heat. Steam therefore also results in the efficient killing of cells, and the coagulation of proteins. When you cook beef at home, for example, it can become tough when roasted in a covered pan in the oven. But just add a little water in the bottom of the pan, and you will find that the meat will be tender! The temperature is the same and the time of roasting is the same, but the result is different. Now (as in an autoclave) add another parameter, pressure. By putting this same roast in a pressure cooker you can reduce the time it takes to cook this roast by at least three quarters, and you still get just as tender a finished product.

How does killing occur?

Moist heat is thought to kill microorganisms by causing coagulation of essential proteins. Another way to explain this is that when heat is used as a sterilizing agent, the vibratory motion of every molecule of a microorganism is increased to levels that induce the cleavage of intermolecular hydrogen bonds between proteins. Death is therefore caused by an accumulation of irreversible damage to all metabolic functions of the organism.
Death rate is directly proportional to the concentration of microorganisms at any given time. The time required to kill a known population of microorganisms in a specific suspension at a particular temperature is referred to as *thermal death time (TDT).* All autoclaves operate on a time/temperature relationship; increasing the temperature decreases TDT, and lowering the temperature increases TDT.

What is the standard temperature and pressure of an autoclave?

Processes conducted at high temperatures for short time periods are preferred over lower temperatures for longer times. Some standard temperatures/pressures employed are:

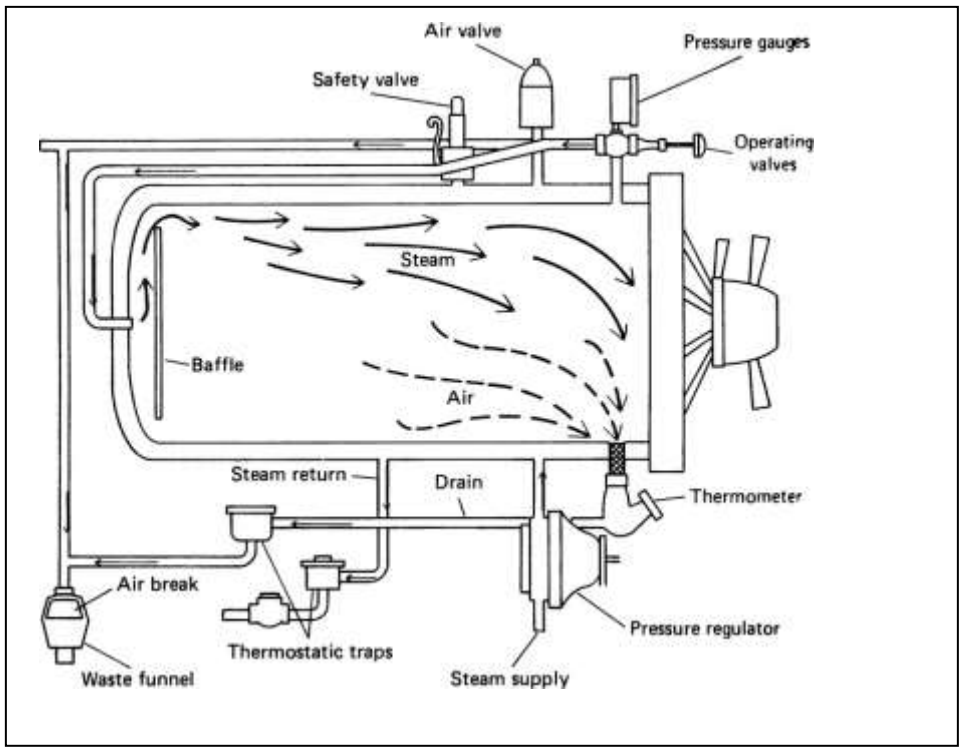
115 Deg C at 10 psi
121Deg C at 15 psi
132 Deg C at 27 psi

Psi = Pressure unit standing for pounds per square inch

Please note that after loading and starting the autoclave, the processing time is measured after the autoclave reaches normal operating conditions of for example 121Deg C and 15 psi pressure, NOT simply from the time you push the "on" button.

How does the autoclave itself work?

The diagram of an autoclave depicts the simplicity of its operation. Basically, steam enters the chamber jacket, passes through an *operating valve* and enters the rear of the chamber behind a *baffle* plate. It flows forward and down through the chamber and the load, exiting at the front bottom. A *pressure regulator* maintains jacket and chamber pressure at a minimum of 15 psi, the pressure required for steam to reach 121 Deg C. Overpressure protection is provided by a *safety valve*. The conditions inside are thermostatically controlled so that heat (more steam) is applied until 121C is achieved, at which time the timer starts, and the temperature is maintained for the selected time.



How to achieve perfect sterilization every time.

By understanding the operation of the autoclave and other issues associated with your sample, you will be successful every time.

Time/ Volume/ Mass/ Insulation/ Microbe concentration

You must think about all of these variables! There is no simple formula for how long a certain item needs to be autoclaved to achieve sterility. Consideration must be given to the type of primary container (the beaker or flask or packet containing the item to be sterilized), the volume of liquid, amount of solid material, and the secondary container (such as a tray containing the primary container). Some examples of the considerations needed are described in the following sections.

Time is critical

As the cycle time will vary with the composition of the load, it is important to determine the appropriate time requirement. Some people assume that a time of 30 minutes is sufficient; however this often proves to be a very costly mistake.

Secondary Containers

Plastic or steel containers (trays) are commonly used to contain material during autoclaving, since it is important to contain spills. But don't forget that such containers alter the nature of the autoclave run!
Polypropylene plastic pans with 6 inch sides are favored over polyethylene and polystyrene because it can withstand autoclaving without melting.
(Don't ever autoclave a plastic item -- like a tray-- if you are not sure it can handle the heat. It is no fun to pry out a melted tray!). However, the use of a plastic container increases the time needed for autoclaving, since plastic is a good insulator. Always add 5 minutes when using a plastic tray. On the other hand, stainless steel containers are not only durable; they are a better conductor of heat so the run time will be a little faster.
Do not use overly deep containers (greater than 6 inches), which may prevent displacement of air from the bottom. Also, ensure that steam can flow around the secondary container.

Volume

Obviously, the higher the volume, the more time is needed for sterilization (see general guidelines below). Generally, the volume of liquid per container is a more important consideration than the total volume. A 2-liter flask containing 1-liter of liquid takes longer to sterilize than four 500 mL flasks each containing 250-mL of liquid!

Indicators

These are tools used to validate the autoclaving process. However, use this with caution. Stick-on tape indicators can only be used to verify that the autoclave has reached normal operating temperatures for decontamination but not that the run was long enough. Biological indicators can be used in the efficacy testing of the autoclave process to effectively sterilize the contents being treated.

JUST TO BE SAFE

When running the autoclave make sure that it reaches the desired pressure and temperature.

Also, before using the autoclave, check the drain screen at the bottom of the chamber and clean if blocked. If the sieve is blocked with debris, a layer of air may form at the bottom of the autoclave, preventing efficient operation.

Microbial load

Contaminated items take longer to sterilize than clean items. Consequently, water sterilizes faster than yeast-extract containing media (which contains lots of microbes), or media left at room temperature for a while before autoclaving (which allows the concentration of microbes to increase). Also, some types of microbes are more resistant to autoclaving than others.

Be cautious of packages wrapped too tightly. Air and steam do not mix readily. Air, being heavier than steam, normally is displaced to the bottom of the sterilizer and is then forced out through the drain. If your dry items are wrapped too tightly, however, air is trapped and cannot escape. It forms cool air pockets at the center of the packages, preventing the items from reaching temperatures sufficient to kill all microorganisms.
If you have a large bag of dry items to sterilize, consider adding some water to the bag. This will create additional steam which will displace the dry air from the bag, increasing the rate of heat penetration.

Can things be autoclaved too long?

Yes. Nutrients in media, for example, often break down in the presence of heat. Consequently, a load of media filled containers should be of similar size, shape, content and volume, because exposure time is based on these characteristics. Otherwise some items might cook too long, and others too short.

Packing the autoclave

As much attention must be applied to loading the autoclave as was given to packaging. Again, the determining factor is ensuring heat/steam penetration. Therefore care must be given to avoid overloading the chamber or placing bags in the chamber which are too large. You should also leave room between bags, bottles, etc. for steam circulation. If you must cram the autoclave very full (or fill a tray full with bottles, you probably have to increase the treatment time by 5-10 minutes. Some general guidelines. Here are some recommended times for autoclaving liquids of the following volume per container:

75 – 200 ml	20 minutes
200 – 500 ml	25 minutes
50 – 1000 ml	30 minutes
1000 – 1500 ml	35 minutes
1500 – 2000 ml	40 minutes

Remember to modify these times as needed!!!!! For example, more time is required if the flasks in a plastic tray (which is the standard method); if many bottles are close to each other in the tray; if the chamber is full of several trays; if the liquid contains microbes; if you are using plastic instead of glass containers; etc. Therefore, you probably need to go longer than the times indicated above.

Let's talk about safety

Due to the fact that autoclaves utilize steam, heat and pressure, the risk of personal exposure and potential harm is great. Personnel should wear proper personal protective equipment, i.e. heat resistant gloves, eye protection and a lab coat, particularly when unloading the autoclave.

Regularly inspect the autoclave for proper operation. Do not assume that the temperature and pressure is down before opening the chamber (look at the gauges). Even if the pressure gauge shows "0", open the chamber carefully; crack the door to allow steam to dissipate (don't fling the door open, as steam might come out and burn you).

After opening the door, let items sit for five minutes before handling. This will reduce the chance of boil-overs and burns.

Never place sealed containers in an autoclave, they might explode! This allows for expansion during the cycle. Caps must be slightly loose so that pressure created during the cycle does not cause the vessel to break. For screw-cap containers, you can make the lid hand tight and then loosen the lid by one-half turn.

Always leave a few inches of "head room" in your containers. That way, if the item boils, it won't spray out into your face. Liquids to be autoclaved must be in an autoclavable vessel that is at least twice as large as the volume to be autoclaved (i.e. If you are autoclaving 1 liter of media, you need to put it in a flask that hold at least 2 liters).

Always autoclave media in a pan, to contain spills. Agar will clog the drain in the autoclave and break it.

Do not autoclave items containing solvents, volatile or corrosive chemicals (phenol, trichloroacetic acid, ether, chloroform, etc.) or any radioactive materials.

CERTIFICATE OF PLANT ITEM REGISTRATION

Occupational Health & Safety Act 2000
Occupational Health & Safety Regulation 2001

ABN: 81 913 830 179
Phone: 13 10 50

Registration No: **U 6-199458/16 /0** **Issue Date:** **22/02/2018** **Expiry Date:** **22/03/2019**

Controller: RENEGADE GAS PTY LTD **ABN:** 50074008496
Trading As: SUPAGAS NSW & QLD
Postal Address: 5 BENSON LANE
INGLEBURN
NSW 2565

Item Type: Pressure Vessel

Description of Item:

Chamber 1 Hazard Level	B
Chamber 1 Contents	Harmful
Chamber 1 Volume (l)	7500
Chamber 1 Design Pressure (kPa)	1750
Chamber 1 Fluid Type	Gas
Manufacturer	UNKNOWN
Model	UNKNOWN
Serial Number	7.5KL-SU-617
Pressure Vessel	Static storage (non-corrosive content)

Location: 90 KENOMA PLACE
ARNDELL PARK NSW
(If mobile plant, this is the location where usually stored or maintained)

Prod System

Special Conditions:

CONDITIONS:

1. This registration applies only to the item described above which has been notified to SafeWork NSW in accordance with the OHS Regulation 2001.
2. This certificate of registration (or a copy) must be kept in the vicinity of the item of plant to which it refers. For mobile plant, the Registration number must be displayed on the item in a prominent location and be of a permanent nature and clearly legible.
3. This Registration is automatically invalidated if the item is altered in any way that is different to the original design specification , or changes the capacity of the item. This does not include routine maintenance, painting or changes equivalent to original design specifications.
4. The Registration Number should be quoted in all correspondence to SafeWork NSW regarding this item. Any queries should be addressed to SafeWork NSW Licensing Unit.

Total Fee Paid: **70.28** **Receipt No:** **30-2190**

HAINES GAS SERVICES PTY LIMITED

Established 1977
Liquefied Petroleum Gas Equipment Specialists
Boiler and Pressure Vessel Inspections
ABN 83 001 518 850
8 MARINUS PLACE, ERINA NSW 2250
Phone (02) 4367 6055 Fax (02) 4367 6973
www.hainesgasservices.com.au

PRESSURE VESSEL CERTIFICATE / SURVEY REPORT

Owned By:	Renegade Gas Pty Limited	Region: Sydney
Location:	SWS Healthcare 9 Kenoma Place Arndell Park 2148	
Registration Number:	128-U-7919	Serial Number: 7.5KLSU-617 Capacity: 7500L
Registration Location:	At vessel support leg below manufacturers data plate	Legibility of Registration: Legible
Hazard Level:	B (AS4343)	Maximum Safe Working Pressure: 1750kPa

Inspection Details: External Inspection

Internal Surface:	N/A
External Surface:	Satisfactory - Areas of surface rust - Paintwork dirty and pitted - A vessel clean is suggested
Safety Valve/s:	Satisfactory - Renew with 1" and 1 1/4" at internal
Pressure Gauge:	Satisfactory
Contents Gauge:	Satisfactory
Fitting Dome or Cage:	Satisfactory - Locked
Other Fittings:	Satisfactory - One end plate inspection plug corroded at hex head area - Requires attention/renewal
Supporting Structure:	Satisfactory
Surrounding Areas:	Tidy - The vessel installation is protected by guard railing - Vessel area and access to be kept clear of bins and other materials
Signs:	Satisfactory - Hazchem signage at each side of vessel

Comments/Instructions to Owner:

The vessel is utilised for vapour service. Fill and drain valve upgrades are completed. 3/4" plug at top of vessel. Installers compliance plate at overpressure valve T piece. Water tap at main building adjacent to vessel. Vapour service line pipework is painted incorrect colour code - should be arctic blue or white with labelling attached to pipework.

Replacement of Items:

Next External Survey Due:	March 2019	Next Internal Survey Due:	2020
Inspected By:	Rob Haines	Date:	6/03/2017
Serviced By:		Signature:	[redacted]

General Requirements:
This certificate is issued on the condition the pressure vessel is operated and maintained in a safe condition and in accordance with the relative standards and codes applicable to its use, principally AS/NZS 3788 and 1596. Our company is to be advised as soon as practicable of the relocation or disposal of the vessel. This certificate is issued on condition of payment of the required fee. Inspection ID: I040375

ENERGY MANAGEMENt SERVICES

Energy Managemen Services Pty Ltd
Unit A4 / 5-7 Hepher Road, Campbelltown NSW 2560
PO Box N219 Campbelltown North NSW 2560
(02) 9532 1840
www.energymanagementservices .com.au

ABN 16 609 029 738

PLEASE PAY BY	AMOUNT	INVOICE DATE
30/06/2018	$896.50	31/05/2018

TAX INVOICE NO. 42575

Accounts
Med-X Pty Ltd T/a SWS Healthcare
Solutions (Formerly State Waste Services
Australia Pty ltd)
PO Box 1184
Oxenford QLD 1184

Order No.:
Job No.: 32745
Salesperson: Shane Bollinger
Site: 9 Kenoma Pl Arndell Park
Site Contact: Shane

Description
Asset ID 31 -Asset Type Steam Boiler - Service Level 5 Weekly - Service Date 30/05/2018

Item	Quantity	Unit Price	Total
5-weekly Maintenance	1.00	$815.00	$815.00

Sub-Total ex GST	$815.00
GST	$81.50
Total inc GST	$896.50
Amount Applied	$0.00
Balance Due	$896.50

Thank *you.*

This is a claim under the Building and Construction Industry Security of Payments Act (1999) (Amended 2002)
All goods remain the property of Energy Management Services until full payment is tendered.

Direct Deposit
Bank Commonwealth Bank of Australia
BSB 062 201
Acc. No. 10153248

D

Credit Card (MasterCard or Visa)
Please call 02 9532 1840 to pay over the phone.

ENERGY MANAGEMENt SERVICES

Energy Management Service Pty Ltd
Unit A4 / 5-7 Hepher Road. Campbelltown NSW 2560
PO Box N219 Campbelltown North NSW 2560
(02) 9532 1840
www .energymanagementse rv ices .com.au

ABN 16 609 029 738

CUSTOMER JOB NO. 32745 -11637 - Damien Prentice

PO#
Date Due 26/05/2018

Customer Details	
Name	Med-X Pty Ltd *Tia* SWS Healthcare Solutions (FormerlyState Waste Services Australia Pty Ltd)
Address	9 Kenoma Place Arndell Park NSW 2148
Contact	
Telephone	1300 462 720
Email	chris@statewaste.com.au

Site Details	
Name	9 Kenoma Pl Arndell Park
Address	9 Kenoma Place Arndell Park NSW 2148
Contact	Shane
Telephone	0429 340 452
Email	

Work Requested

Asset ID 31 -Asset Type Steam Boiler - Service Level 5 Weekly - Service Date 30/05/2018

Work Completed

Travelled to site
Signed in and reported to contact
Carried out 5 weekly services and safety checks on the Steam boiler, as per maintenance agreement and AS2593.
Opened and serviced gas burner
Removed burner assemblies and cleaned ignition and diffusers
Removed and cleaned flame signal scanners
Cleaned and checked air inlet, dampers, linkages, blower motor and impellers
Checked and carried out gas pressure drop test on gas valve trains and components
Removed and cleaned gas, water and auto blowdown filters
Checked and tightened all hand hole doors.
Checked and tightened all gauge cock glands
Carried out correct blowdown of gauge glasses and cleared water legs of sludge
Fired gas burner and tested operation of controls and safety interlocks
Carried out combustion gas analysis
Turned boiler of as I found it.

Signed out and called/reported to site contact.

Materials Used

Description	Location	Used

The above works have been supplied and installed to my complete satisfaction.

Customer:

Print Name _____ Signature _____

The above works have been supplied and installed as per relevant Australia Standards.

Technician: Damien Prentice

Print Name _____ Signature _____

STUDY DIRECTOR:	**SPONSOR:**
Name: Mina! Patel	Name: Chris Liney
Position: Team Leader, General Microbiology, Eurofins ams Laboratories	Position: Managing Director Med-X Pty Ltd
Signature :	Signature :
Date: 04-/o,j?-Ol'8	Date: 04/01/18

Function	**Name**	**Signature**	**Date of Agreement**
Study Director:	Mina! Patel	,	0&./o,/w,g
Sponsor/Study Monitor:	Med-X Ply Ltd		
Analyst/s :	Hong Liu	3/4	' 4(0 , (1f
Quality Assurance Manager:	Fergus O'Connell		

LABORATORY TEST FACILITY

Eurofins ams Laboratories Pty Ltd
8 Rachael Close
Silverwater NSW 2128
AUSTRALIA

STUDY TIMETABLE

Study Initiation Date : 02/01/2018
Proposed Experimental Initiation Date: 02/01/2018
Proposed Experimental Completion date: 10/01/2018
Proposed Final Report Date: 12/01/2018

1.0 INTRODUCTION

1.1 Objective and scope

The aim of this study was to validate the claim of reducing the microbial contamination load by minimum of **4** logs using BONDTECH BTT6X13 located at 9, Kenoma Place, Arndell Park **2148.**

Geobacillus stearothermophilus ATCC 7953 spores (EZTest Biological indicator) will be used for the study as they are recognised as the most resistant form of micro-organism to chemical and physical sterilisation. *Geobacil/us stearothermophi!us* has therefore been chosen owing to the fact that it is an obligate thermophile whose spore is one of the most heat-resistant spores of aerobic microorganisms. The genus *Geobacillus* has a growth-temperature range of 37-75 C, with an optimum at 55-65°C.

1.2 Regulatory Acceptance

The study is designed in accordance with accepted principles of experimental investigation.

1.3 Laboratory Practice

This study will be conducted in accordance with the OECD Principles of Good Laboratory Practice (1998).

2.0 STUDY DETAILS

2.1 Test item

2.1.1 BONDTECH BTT6X13- Refer to Appendix 3 for the specifications and details of the autoclave.

2.2 Materials and Equip nt

2.2.1 Pipettes
2.2.2 Pipette tips
2.2.3 Petri dishes
2.2.4 Biological indicators EZTest
2.2.5 Bio Safety Cabinet (BSC)
2.2.6 Tryptone Soy Agar (TSA)
2.2.7 55-60°C Incubator
2.2.8 9ml Sterile Deionised Water
2.2.9 Vortex

3.0 METHOD

3.1 Autoclave operation at Med-X Pty Ltd

3.1.1 The study will be carried out in triplicate .

3.1.2 The maximum load capacity of the BONDTECH BTT6X13 is 4 x 700L bins. The study will be carried out at the maximum load capacity of the autoclave.

3.1.3 Five Bis will be placed inside each full loaded bin (total 20 Bis) for each run. One BI in every corner of the bin and one will be placed in the centre of the bin.

3.1.4 At the end of the run, all 20 Bis will be retrieved and transported back to Eurofins ams Laboratories for further testing.

3.1.5 Total six Positive Control Count Bis will be transported to Med-X Pty Ltd along with the other Bis. The positive control Bis will not be subjected to any treatment and will be transported back to Eurofins ams Laboratories to perform the enumeration to ensure the count of minimum 10^4 Spores/BI. Transporting the Positive Control BI to Med-X Pty Ltd and back to Eurofins ams Laboratories will be carried out prior to performing the enumeration to ensure the spore viability during the transit of Bis.

3.2 BI testing at Eurofins ams Laboratories

3.2.1 Three Positive control Bis which will be transported to Med-X Pty Ltd and back to Eurofins ams Laboratories will be subjected to enumeration test at Eurofins ams Laboratories, which will include the serial dilution and plating of the suspension. TSA will be poured in to the plates and plates will be incubated at 55-60°C for 2 Days. The colonies will be enumerated at the end of the incubation period.

The other three Positive control Bis which will be transported to Med-X Pty Ltd and back to Eurofins ams Laboratories will be subjected to Growth/No Growth analysis along with the Test Bis.

One Positive Control Count will be carried out at Eurofins ams Laboratories without transporting the BI to Med-X Pty Ltd.

3.2.2 The Test Bis will be subjected to Growth/No Growth testing and will be incubated at 55-60°C for 2-7 Days. Three Positive Control Bis will be incubated along with the

Bis. At the end of the incubation period the Bis will be examined for any colour change.

4.0 QUALITY ASSURANCE

Process Audit required which will be scheduled during the study. The Eurofins ams Laboratories Quality Assurance Unit is responsible for reviewing Study Plans, the final report and monitoring critical phases, processes, facilities, and personnel on a regular basis as well as auditing official reports to ensure that they accurately and completely reflect the raw data and comply with GLP. Audits are performed in accordance with relevant Test Facility Standard Operating Procedures.

5.0 PROTOCOL AMENDMENTS AND DEVIATIONS

5.1 The Study Director may make written amendments or deviations to this protocol. All amendments and deviations will be signed and dated by the Study Director, Quality Assurance , the Test Facility Manager and when necessary by the Sponsor's Representative.

5.2 All amendments and deviations will be signed at the time the change is made and stored with the protocol.

5.3 Any deviation and/or amendment to the Study Plan will be reported in the Final Report.

5.4 The impact of the amendment on the study will be described.

5.5 Amendments must be reviewed by QA. Copies of any amendments and deviations will be sent to the sponsor during the course of the stu dy. **A** Deviation Log is provided in Appendix 2.

6.0 REPORTING

The Final Report will include - but will be not limited to - the following information:

6.1 Name and address of the Sponsor and of the Test Facility

6.2 Compliance with Good Laboratory Practice

6.3 Statement of Study Director

6.4 Statement of Quality Assurance

6.5 Identification of the study (title, code, key personnel)

6.6 Period of the study (Study initiation, approval of study plan, start of experimental phase, end of experimental phase, date of Final Report)

7.0 ARCHIVING

The original data, documentation, Study Plan and final report will be archived in the GLP archive of Eurofins ams Laboratories, Silverwater, in accordance with Eurofins ams SOP No QA-004 'Control of Quality Documentation.'

8.0 STATISTICS

Statistical methods used during the course of the study will be documented in the study file and summarised in the report.

9.0 DISTRIBUTION LIST

One copy of the signed study plan will be distributed to the following study participants:

9.1 Study Director
9.2 Sponsor/Study Monitor
9.3 Facility Manager
9.4 Quality Assurance Manager

10.0 ACCEPTANCE CRITERIA

10.1 The positive Control count for all three Bis should be minimum 10^4 Spores/BI.

10.2 For all the Test Bis, there should be No growth detected (No colour change in the Self-contained BI) at the end of the incubation period.

APPENDIX 1

RESPONSIBILITIES

- The General Microbiology Department and QA Departments are responsible for the overall adherence to the protocol. Specific duties will include the following:
- Facilitating the timely execution of this protocol by provision of appropriately tr ained personnel, equipment and materials as required.
- Ensuring compliance with GLP, in house SOP's, and this Protocol.
- Ensuring that the testing equipment to be used is adequately maintained and all monitoring/controlling instruments are calibrated, as appropriate.
- Each step of the process as defined in this protocol must pass the defined acceptance criteria.
- All employees shall be trained for their responsibilities in executing the validation protocol.
- This validation study protocol must be approved by all signatories prior to execution.
- Med-X Pty Ltd to review and approve the protocol.

APPENDIX 2

DEVIATION LOG

The following log sheet is to be filled out in the event that any deviations occurred in this protocol. For each deviation enter the Test Number or activity where the deviation was found, a description of that deviation and whether it was critical or non-critical (C or N respectively).

Sheet of

Test Number or Activity	Deviation	C orN	Initials/Date

APPENDIX 3

PROPOSAL FOR:

MEDICAL W STE AUTOCLAVE SYSTEM

BY:
BONDTECH CORPORATION

PROPOSAL J CLUDES:
THE MA UFACTURING/PROCUREME T,
TESTI G OF
AUTOCLAVE STERJLIZATIO EQUIPME T

May I, **2012 Rt**
April 28, 2012

J.I.0 **BOIYDTECH** A UTOC LAVE /ST ER IL IZ ER SYSTEM SPECIFICATIONS

High vacuum/High pressure, Computer controlled, Bondtech auloclave system lotreat biomedical waste on-site

1.J.J AUTOCLAVE DI M E NSIO NS AND CAPACITY

BTT6X13
6' dia X 13' long
Pr 1.1re Grode Carbon Steel
Number of bins : 3 or 4/ per load
Capacity: - 500 to 600 kg/cycle (@ standard Med Waste den$ily of 5.5 lb /cufl)
~ 750 to 850 kg/cycle (Port Waste)

1.1.2 AUTOCLAVE Y!sS S EL SP!sCIFICATJONS

Opening Assembly:	Single door/quick opening door/safety pin interlock
Loading Arrangement:	Horizontal
Pressure Vent:	Spray condenser

J.1.3 INS LATION

·n,c extctiorofthe autoclave will he insulmc<l with *T* oflibcrg13ss. which will be covered witlt an aluminum jacket lo protect the i nsu laiion, and to make sure the equipment c.,n be kepi clean.

1.1.4 PROCESS VALVES

Complete with the process valves including steam supp l y, pressure vent and safet y relief.
The steam inlet val ve is a *J,ig/,-rusollllli oll pllellm oti c pl'oporrio11nl '"" ' e fo,. a smooth acc11,-111e co11trnl of 7t!am prcssurt!.* For safety. Lhc s team inlet valve is a normally closed valve tha t closes in the event of any power loss.

1.1.5 A UT OC LAVE VESSEL OES I G '

The autoclave vessel is designed, fabricated. tested and certified in accordance with the ASME Boiler and Pressure Vessel Code, Section Vil, Division l. *Cor* Unfired Pressure Vessels. The vessel is designed for full vacuum. The sterilization unit is formed and welded into a horizontal cylindrical prcs. ure vessel with a hydraulic quick opening door. The vessel includes two rigid suppon saddles 10 facilitate a simple ins tallati on. The front face of the vessel has a machine groove for t he rigid high temperature seal gasket.

J.1.6 V AC UU M SYST!sM.

Vacuum: Vacuum: 24-28" Hg
High Efficiency Vacuum System

Vncuum Cap nbili ty: 24"-28" Hg , 3 minu tes

Pre-vacuum: The pre-vacuum process will evacuate the autocluvc 2•'f -2.8' Hg . This process will achieve the removal of air from the autoclave 10 provide a quick and ef'ficient penetration of steam throughout the medical waste load.

Pos c- vacuum: The post-vacuum process removes excess steam from the vessel and expedites the steam purging process. This process removes excess moisture from wnste load resulti ng in a lighte r/drier treated waste product for disposal. Moisture removal effectively controls nuisance odors.

1.1.7 ST€Ai\I COND ENSER

Independent stca111 condenser manufactured of pressure-grade steel. The condenser is designed for quick and efficient steam purge rrom the autoclav,e essel. Process Steam is fully condensed cxtenially to the autoclave vessel. *Stenm pur ge proce.<r is complctctl ll'ithi11 app1·ux 2-3 111i 11111cs.*

I. I. 8 DOOR OPERATION, SEALING AND LOCKING i\IECHANISTII

The door is hinged mounted on the au to cla\'c. Mounting arrangements 10 provide full movement 10 a full open posit ion. Preferred scaling system 10 utilize one-piece extruded material O-ring seal type. The door has a pos11ivc lock type safety design per the ASME requir cmems . The locking mcchani m is interlocked with the control system to pre"ent opening the door while under pressure. and lo prevent pressurization when the door is un lo cked . The door is designed with scwral safety features that include electric/mechanical interlock swi tch, PLC interlock. door safety handle interlock. visual it¢ gauge for pressure monitor and analog dial pre..ssure/temperature indicators.

1.1.9 I AT ERI AL HA 'DL I NC

Autoclave tracks will he provided for the autoclave bins.
Optional automatic hydraulic Lifi Table for assisting in loading /unl oad ing bins

I O SYSTE I PI PI ;-- G.

The a utocla,·e sys1cm will completely piped at the factory prior 10 shipmen! for si mp le in, tnllau on. The system 1>iping will consist of the following :

- Steam condenser piping - team outlet piping direct to ;1earn condenser. St m is condensed by controlling water flow through the steam condroscr with respect 10 steam pressure inside th,e ·esscl. The water 0o\\ control minim izes the consumption of water.
- Condcns.11c Drain Steam traps (2) - rron1 and rear S1eam traps maintains the ,-cs.sci free of condcnSAIC .
- Vacuum Va1ve/Piping - autoclave is hard pipe<l 10 either steam ejector or vacuum pum11 for integrating vacuum sys1c111 lo ve,ssel.
- Steam Inlet Valve/Strainer-propomonnlly comrolled steam inlet valve for smooth and accurate control or steam pressure inlet. Steam inlet valve is controlled by a Pl D loop controlled by the PLC .

I.I.I I CONTROL SYSTE I/PROCESS VAL VES/C ONTROL PANEL & !NSTR UM ENT AT IO '

The autoclave control panel i. package in a NEMA 12 rated panel. The autoclave system is controlled by a s1a1e-of-t he,-a1 "Sup rMicro" Progm111111ahlc Logic Con troller (PLC) with mod m hookup carab iliti cs for online supp on. The PLC performs automatic ;icrilization control control that include *pre-, •acuum* . pressurization 1l< a1 soak. *vem* and *posH •acuum* . The PLC moJlitors pre.<..surc v ssl'J cont.lit ions for providing safety inte rlo ck for door operatio n.

1.1.12.1 SU l' ER II CRO PROG RAM MA BL E LO G IC C O NT RO LLER (PL C).

The FX2N Series PLC provides lhe nmc1ion con 1rols 1ha1 automatically comma nds 1he process cycle ste1 1s for the autoclave syslem. Extensive data memory (over 8,000 Dnta Registers) for capturing real time operating parameters thal continu ously monitors autoclave system performance.

The FX2N Series PLC support on-line 1roll bleshootin glprogramming functions. used in)'stem dev elopment and commissioning. Remote programming/monitoring capability by modem provides for nnmediate 1cclmician suppon. This PLC syslem has 1he ex1emal dala link integration capability for communication wilh 01her peripheral systems (PC. nelwork. comrol syslems. clc).

Powe rf ul fenlu res in clude :

- Windows Programming • Use Ladder, List or SFC lan gua ges.
- Opcra1or ln1erfaccs- Flexibl e selection 10 match specific customer application
- E.x1ensive Program Memory - 8.000/16.000 s1e ps
- Ex1ensive Data Memory - 8000 Dnta Regislers
- Enhanced Program Through rut - SO nanosccondsls1cp
- Enhanced Process Cont rol - Aut o-Tu ning. PI O loop
- High-Speed Processing-60KHz counters. J Oms tim ed&50ushardw re interrup ls
- Embedded Motion Comrol - 20,000 hz pulse train. Trapezoidal ramp instruc1ions
- High function Math - *32* hit noacing point. Square Root Trigonometry
- Year 2000 Complianl- Y2K Comp lianl, 4 digit year
- Real Time Clo ck/ Date - For scheduling dale and lime stamping
- Flexible Con figurations - From 16 to 256 1/0 & cxlensive special function 1/ 0 capabililies
- Communicalions - Bui lt-in 2..i port (RS-232/RS422/RS4S5) & PLC-PLC nc1working
- Open Network Connectivity - Modules for Profibus DP. Profibus DP 110. AS-I & CC Link

1.1.12.2 SYSTEM **P RO G RAM!\ IJ NC**

PLC program applica1io11 is based on the industry srnndard ladder logic. Programming can be performed by authorized personnel with access 10 syslcm en1ry code.

Simpl pushbuuon enuy pad allows 1heau1horized 1:>ersonnel 10 en1er specific parameters including lhe followi ng:

- Pre-Vacuum Sci Point
- Pre-Vacuum Timer
- Slcrilizalioll Temperature/Pressure
- Stcriliza1ion Heat Soak Tim e
- Vcm Time Se1 Control
- Pos1-Vacuum Sci Poin1
- Pos1-Vacuum Timer

In addi1ion 10 the above, specific alam1s are sc1up for triggering equipmenl shuldown and nolifying 1he operator in the event thal temp era1ure and/or pressure parame1ers are no l Sllt is li ed.

The s1anup program wi ll be ins1allcd and 1es1ed by Bondtech lechn icians during stan up.

1.1.13 CONTROL SVSTEi\1 PR I NT f. R - ll0 11c y >1 ell C irculnr Chart Reco rder

The comrol system printer is a state of the an Honeywell prin te r. The printer gencrntes conti1 1uous data that provides the history of every au tocl ave cy cle .

The Honeywell 4500 series printer will record and generate chart data that includes 1hc follow ing:

- Ti me and Date of every au1oclavc cycle.
- Cycle Start and Cycle End T i me .
- Continuous Cycle Vacuum & Pressure
- Continuous Cycle Temperature

2.0 BONDTECH SHREDDI 'G SYSTEM . UIGH VOLUi\IE

Feed Matcrinl - General Autoclaved Medical Waste composed of plastic !ilms. plastics comaincrs, plastic tubing, cloth. glass, light gage steel medical sharps (scalpels, scissors, syringes etc)
Feed Method - By bin ti pper. Ma teria ls delivered by Bondtcch Autoclave Bin
Discharge Method - To customer sup plied compac1or or collec tion container
Throughput Rutc - BTT /MM -70 - shredder rntcd to accept 3000 lbs. per hour
Shred Si:tc - Approx. I" wide x 4" 10 8,. le ngths .

2.J BTI '/:Vl:Yl-7 0E SHREDDER

CuningClmmber - 29" ., 52"
Two hexagonal , coumcr rotating shafls (5.2")
KniYes - Shaft cenler distance: 9-7/16"
Number of kn i ves: 48 - Approx
- Knife width: 1.5" (39 mm)
Knife dinmc 1c1 14.4"
# of teeth per knife: Two, *offset* ,he for quick mnteri:ils cnpturc
Knife ma t er ial: Heat-treated alloy steel
Contoured cleaning fingers and hex bore spacers between knives Drive System - 6 0H P, 3 plrnse
Planetary Gear Reducer
Fnst/Slow Shoft Speed - 21 / 17 rpm
Mn.ximum Too1J1 Force - 54,600 lbs.
Maximum T orque - 32,700 ft-lbs.
SEAL SYSTEM - Sprcinl Configur ed for l\lcdicnl Wnste

2.1SUPPORT ST AND - 6" wide flange construction
60" discharge height
Designed to clear customer's compactor/discharge comaincr

2.3 BTf f.vlM -70E FEED ASSIST HYDRA ULJC RAMHOPPER
A-36 Plate - Reinforced µlate construction
Ram opening 33" x 66" approx.
Hydrau lic cylinder clevis mounted to hcavy-d1 1ty ram platen
Guide Mechanism - Guide Rollers

2.4 CONTROL PANEL - NEMA 4 enclosure/Keyed power switch
Illuminated function buuons for shredder operation
Ci rcu i t Breaker w/lockable door operating mc ch.
Full Vo ltage , across -t he- line. magnetic molor starters
Control power transformer - 24 \/DC
Allen Bradley Programmable logic controller-system op.& monitoring
Run t ime hour meter/Emergency Stop Button

2-5 **HYDRAULIC CART TIPPER . NO TIPPER**
TI PPING WILL BE PERFORMED BY FORK LIFT **SYST**

INSPt;CTIONS
australian boiler & pressure vess el ins pe ctio n services ply ltd

PO Box 7261
Mt Annan NSW 2567

A.B.N. 83120 606 297

PH: (02) 4647 7698

accounts@abvinspect ions.com.au

Tax Invoice

STATE WASTE SERVICES NSW PTY LTD
ATTN- MR CHRIS LINEY
PO BOX 7439
BAULKHAM HILLS BC NSW 2154

Invoice # :	00010891
Date:	27/04/2018
Page:	Page 1 of 1
Ref:	
Terms:	STRICTLY 7 DAYS

Quantity	Description	Unit Price (ex-GST)	Total (ex-GST)
	In-Service Inspection of pressure equipment on site: 9 Kenoma Place, Arndell Park on 1/04/2018		
1.5	Water/ Firetube Boiler, *ID No:* 373-B-186	*520 .00*	*$780.00*
1.5	Sterilizer/Autoclave ID No: 373-U-1242	160.00	$240.00
1.5	Vessel ID No: 373-U-1243	130.00	$195.00
1	Travel Charge- Inside Zone 1	20.00	$20.00
1	Supply of 1/2 inch 1034 kpa relief valve	67.00	$67.00

ABV Inspections Ply Ltd Proudly suppo rting

L t <ili2t

https://donate.cerebralpalsy.org.au/

Subtotal:	**$1,302.00**
GST:	**$130.20**
Balance Due:	**$1,432.20**

P ayment outside ABV Inspections trading terms may incur a 10% surcharge on future account s.

DIRECT DEPOSIT ABV Inspections Pty Ltd

BSB 112-879
Account No 428 081 737

Please use invoice number 00010891 as your payment reference.

Email your remittan ce to accounts@abvinspections.com.au or detach this section and post.

0 VISA O CHEQUE

STATE WASTE SERVICES NSW PTY LTD
ATTN- MR CHRIS LINEY
PO BOX 7439
BAULKHAM HILLS BC NSW2154

Call (02) 4647 7698 to make a phone payment, send an email to accounts@abvinspections.com.au or complete the below details.

Card Number: _____

Invoice #: 00010891

Amount Paid: i!il,lltJI.IO

Cardholde r Name: (please print) _____

Expi ry: ____/____ eve: _____

IHSPeCTIOHS
rultralan btller l premH Y!l li!I mi1mtim m n: t i ply ltd

PO Box 7261
NATA Mount Annan
NSW 2567
Ph-(02) 46477698

18641

CERTIFICATE OF INSPECTION-PRESSURE EQUIPMENT

SAFE TO *OPERATE*

Certificate No-ABVC 44400 Re q uired by law- WHS Re g 2011 Cl 246 {2} **Boiler/ Vessel ID No-373•U•1243** **Location of ID No-** TOP END OF SHELL

Hazard Level- C WORKCOVER/SAFE REG NO- U6-163488/12/0

This is to certify that I,DAVE HARMON(WHS Reg Clause 267/ AS 3788 App V)

Inspected the- **VERTICAL AIR RECEIVER**

For- Client/ Owner- STATE WASTE SERVICES

Address- 9 KENOMA PLACE ARNDELL PARK NSW

Site Address Of Unit- AS ABOVE

Location On Site- FACTORY AREA

On the- 21ST APRIL 2018 Following Inspection Procedure No. QP10-42AR and am satisfied that the above boiler/ vessel and its fittings are deemed ***SAFE*** TO ***OPERATE*** up to a maximum pressure of-

SHELL- 1200KPA JACKET- N/A TUBE- N/A

conditional upon any comments/conditions stated below. This Inspection was- EXTERNAL VT & UTK TESTED (INTERN AL EQUIV- AS3788 CL 4.4. I .3)

Next inspection due- **9TH APRIL 2020**

Ne xt Minimum Manda tory Internal insp ec tion Due- (OR UT)-9/4/2022

Additional testing , insp ec t ion , NOT required/ due- N/A

Bo iler power- N/A or, Vessel Volume- 131 Litre s Estimated Serial Number- 012-1562

Ow ner s Plant ID Number- N/A Class Of Construction- AS1210-3 (REC TECHNICAL STANDARD)

Des Reg No - SD20080954-1

Sa fe ty Valves (SRVs) where fitted are insp ec te d as part of this inspection in accordance with AS 3788 Cl 4.7.3. SRVs must be inspected at yearly intervals in accorda nc e with AS3788 Cl 4.7.3. Recommended replacement/ bench test for srvs **in-2022** for co mp lia nc e with AS3788 Cl4 .7.4.2. Vessel owner is responsible for SRV compliance. SRV install date must be marked on valve

Other Comments! Mandatory Repairs fMI - Commissioned Date- DATA UNAVA ILABLE

REFER TO GENERAL REQUIREMENT 8-BOILERS/VESSELS HAZARD LEVEL **A**,**B**, **C** MUST BE REGISTERED WITH THE REGULATORY AUTHORITY (IE WORKSAFEJ **BOILERS/VESSELS HAZARD LEVEL A,B,C,D MUST HAVE DESIGN REGISTRATION WITH THE REGULATORY AUTHORITY (IE WO RKS AFE)• BOILERS/ VESSELS MAY NOT BE ABLE TO BE REGISTERED IF OWNER CAN NOT PROVIDE CORRECT DATA .PLEASE FORWARD COPIES OF DESIGN REGISTRATION CERTIFICATES TO ABV INSPECTIONS**

INSPECTION TYPE- P.E- PERIODIC INSPECTION AS 3788 CL 4.4- /EXCLUDES INSTAL LATION/ MANUFACTURE DEFECTS WHERE APPLICABLE)

INSPECTION LIMITATIONS/ EXCLUSIONS- NONE

GENERAL OVERALL CONDITION OF VESSEL·3- SATISFACTORY CLIENTTASK/ JOB NO- N/A

CONTENTS- AIR, COMPRESS ED- NHG

NEW SAFETY VALVE FITTED 2018.

D Mand ato rv Reoai rs/ M odifica tions Reau ired !Conditional Certificate Issued)
Repa irs requ ired are outlined *on* attached correlat ing report No ABYR 44400
M andato ry repa irs mus t be carried out

[] Re- In spec tion or c onfirm otion of repair s/ modifications required

Inspector *Signature*-

NATA Signa tory -

WORK HEALTH AND SAFETY ACT 2011
WORK HEALTH AND SAFETY REGULATION 2011
AS/ NZS 3788-2006- Pressure Equipment In-Service Inspection

Accredited For Compllanc.'.. with ISO/ IEC 17020

GENERAL REQUIREMENTS

"Safe To Operate "-Mea ns oJI identified hazards that may affect the sofe operation of the plant hove been adequately control.led
'"Recomm end "· Meons advice or suggestions as a course of action. "Manda tory"- Means as required by Low or rules
I -Th i s Certificate/ insoection status must be occessibie at all times- AS3873 B11
2- This Certificate is cancelled when the boier/ pressLKe vessel is moved or dimontted for erection of another site
3- The Owner is to hove the Boiler/ Pressure Vessel svitobty prepared tor the In-Service Inspector - AS 3788 Appendix C
4- The Boiler/ Pressure Vessel is to be oper a ted onty while mainta ined in a safe condition with its fittings in correct adjustment and, where nece ssa ry by Certified Persons.
5- AU Proposed major Repairs. alterations, disposal of or domoge to the Boiler/ Pres.sure Vessel or injUf)' to any on from such domoge is to be reported by the Owner to ABV Inspe c tions 6- The Boiler/ Pressure Vessel ID No a nd /or Registered No is to be kept dean anddistinct.
7-This Certificote is voffd on condition of payment of the inspection fee.
a.item Reg istra tion of Pressure Vessel s h az ard level A,B,C with Worksofe is man da tory. De sign Reg istra tion of Preu ure .Vessels h azard level A.8,C,D with Work.safe is mandatory. Pressure Vesse ls MUST NOT be vsed unless correctly registered . Regislrotion with the regul a lory authority is the respo n b rnty of th e O WNER OF PRESSURE EQUIPM ENT. Penalties of up to $100.000 ap ply *for* eac h unregistered item of plant- WHS ACT 2011 Section 42. Item registra tion numb er must be marked on the item of plant- WHS Reg 2011 Cl 273 (4)- PLEASE CONTACT ABV INSPECTIO NS IF YOU REQUIRE ANY ASSISTANCE OR ADVICE WITH REGISTRATIO NS.
9- Hot wa fer b oile rs {fired heat€:!>) inspected in acc orda nce with AS1200 E2.8/ AS 3788 Ta ble 4.1 sect 4.
10-This Certificate is not valid unless an co mm e n t s.co- ndition s,ins tructio ns sta te d a b o ve, or where stated on any attached correlating doc uments re ferenced above ore complied with
11- Non Mandatory (HL D.E) Inspec tion s/ Re-inspections only carried out when spe cific ally requ ested by c ustome r / customers repre sent a tive.

abv IHSPeCTIOHS
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NATA
PO Box 7261
Mount Annan
NSW 2567
Ph-(02) 46477698

18641

CERTIFICATE OF INSPECTION-PRESSURE EQUIPMENT

SAFE TO *OPERATE*

Certificate No-ABVC 44399

Required by law- WHS Reg 2011 Cl 246 (2)

Boiler/ Vessel ID No-373•U•1242

Location of ID No- DATA PLATE

Hazard Level- B WORKCOVER/SAFE REG NO -U6-I63489/I2/0

This is to certify that I, DAVE HARMON(WHS Reg Clause 267/AS 3788 App V)

Inspected the- **HORIZONTAL AUTOCLAVE**

For- Client/ Owner- STATE WASTE SERVIC ES

Address- 9 KENO M A PLACE ARNDELL PARK NSW

Site Address Of Unit - AS ABOVE

Location On Site - FACTORY AREA

On the- 21ST APRIL 2018 Following Inspection Procedure No. QP10-39ST and am satisfied that the above boiler/ vessel and its fittings are deemed ***SAFE TO OPERATE*** up to a maximum pressure of-

SHELL- 448KPA JACKET- N/A TUBE- N/A

conditional upon any comments/conditions stated below. This Inspection was- INTERNAL *VT* & EXTERNAL VT

Next inspection due- **9TH APRIL 2020**

Next Minimum Mandatory Internal inspection Due- 9/4/2022

Additional testing , inspection, NDT required/ due- N/ A

Boiler power- N/A or, Vessel Volume- 10387 Litres Estimated Serial Number- WI 1-1206

Ow ner s Plant ID Number- N/A Class Of Construction- ASME SECTION VIII DIV 1

Des Reg No- PV6- 160 155/ 12

Sa fe ty Valves (SRVs) where fitted are inspected as part of this inspection in accordance with AS 3788 Cl 4.7.3. SRVs must be inspec ted at yearly intervals in accordance with AS3788 Cl 4.7.3. Recommended replacement/ bench test for srvs in- **2018** for co mpliance with AS3788 Cl4 .7.4.2. Vessel owner is respo nsib le for SRV compliance . SRV install date must be marked on va lve

Other Comments/ Mandatory Repairs **£MI -**

Co m m issioned Date- 1/ 11/ 2012

REFER TO GENERAL REQUIREMENT 8-BOILERS/VESSELS HAZARD LEVEL A,B,C MUST BE REGISTERED WITH THE REGULATORY AUTHORITY (IE WORKSAFE) BOILERS/VESSELS HAZARD LEVEL A,B,C ,D MUST HAVE DESIGN REGISTRATION WITH THE REGULATORY AUTHORITY (IE WORKSAFE)· BOILERS / VESSELS MAY NOT BE ABLE TO BE REGISTERED IF OWNER CAN NOT PROVIDE CORRECT DATA .PLEASE FORWARD COPIES OF DESIGN REGISTRATION CERTIFICATES TO ABV INSPECTIONS

IN SPECTIO N TYPE- P.E-PERIODIC INSPECTIO N AS 3788 Cl 4.4· (EXC LUDES IN STALLATIO N/ M ANUFAC TURE D EFEC TS WHERE APPLIC ABLE}

I NS PECTIO N LIMIT ATION S/ EXC LUSIO N S- N O NE

GENERAL O VERALL CO NDITIO N OF VESSEL- 3- SATISFACTORY CLIENT TASK/ JOB N O- N/A

CO NTENTS- STEAM - HG

SAFETY VALVE/$ ARE OU T OF DATE IN ACCORDANCE WITH AS 3788 CL 4.7.4.2 REC O M M END THAT VALVE/ S BE REPLACED OR OV ERHAULED & BENCH TESTED, SET AT OR BELO W DESIG N PRESSURE OF VESSELAND RECOMMEND THAT INSTALL DATE BE MARKED ON VALVE.[M]

INTERN AL SURFACES OF AUTOC LAVE ARE IN VERY GOOD CONDITION. M AINTAIN CLEANLINESSINSIDE AUTOCLAVE WHERE POSSIBLE

☐ M and a tory Rep a irs/ M o di fic a tions Req uired (Condit iona l C ertifica te Issued)
Rep a irs requ ired *ore* o utlined *on* a tta c h ed c orrela ting report No ABVR 44399
M a nd a to ry rep airs m us t be c a rried out AT N EXT SER VICE

☐ Re- Insp ect ion or c onfirm a tion of rep airs/ m odi fic a tio ns required

WORK HEALTH AND SAFETY ACT 2011
WORK HEALTH AND SAFETY REGULATION 2011
AS/ NZS 3788-2006- Pressure Equipment In-Service Inspection

Inspector Signature-

NATA Signa to ry-

Accredited For Comp liance with ISO/ IEC 17020

GENEKAI IFOUIREMENIS

"Sa fe To Operote "-Mea ns all identified hazards tha t may a ffec t th e s.afe operation of the ptont hove been adequately controlled
"Recommend '- Means ad vice or suggestions a s o course of action . "Mandatory"- Means as required by Law c,r rules
I -This Certificate/ insoec tion sta tus must be acce ssib le at all times - AS3873 811
2- This Ce rtif 1eo te is cancell ed wh en lhe boffer/ pressure vessel is moved or dimantted *for* erec tion a t ano lh er site
3- The Own er is to hove the Boiler/ Pressure Vessel suit o b ty prepared tor the In-Service Inspe ctor - AS 3788 Append ix C
4- The Bo er/ Pressure Vesse l is to be operated only while mainta ined in a sa fe condition wifh its fittings in correc t ad justm e nt ond. where necessa ry b y Certified Persons.
5--All Proposed major Repo in , a lt e ra tio ns, dispo sa l of or d a mage to the Boiler/ Pressu r e V essel or inj ury lo any pe rson from such damage is to be re ported by the Owner to ABV Inspe c tio ns 6-
Th e Boner/ Pressure Vessel I D No a nd/or Reg i stered No is to be kep f clea n and distin c t.
7- This Certificate is valid on cond ition of payment of th e inspec tion fee.
8- item Registration of Pressure Vessels h az ard le vel A.8.C with Work.saf e is ma nd atory . De sign Registration of Pressur e . Vesse ls hazard levef A.B.C.D with Worksofe is mond o tC('(. Pressure Vesse ls MUST NOT be use d unless correc tty reg istered. Re gis tra tion wit h th e regul a tory a uth ortty is the responsibiUty of the OWN ER OF PRESSURE EQUIPM ENT. Pena ltie s of up to $100.0CX> apply for each urv-eg iste red it e m of pla nt- WHS ACT 2011 Section *A2.* Item registrat ion n umb er must be marked on the item of plan!- WHS Reg 2011 Cl 273 {4}- PLEASE CONTACT ABV INSPECTIONS IF YOU REQUIRE ANY ASSISTANCE OR ADVICE WITH REGISTRATIONS.
9- Hot waler bo ilers (ti red he a ters) inspect ed in accordance with AS\200 E2.8/ AS 3788 Tobie 4.1 seci 4.
10-This C ert ificate is not valid unless oil commen ts.cond itio ns.in structio ns sta ted above . or wher e stated on any attached correlating documents referenced abo ve *are* complied wfth
1 1- Non M anda tory {HI D .E) In spections / RE:--inspections only corned out when specifically reque st ed b y customer/ customers repre sent a tiv e .

DOC UM ENT NO . FNI0-17

(A) 1 729

IHSPeCTIOHS
l l ntroion baler & premre m !!!l impecttoo mu:ei P i ltd

NATA
18641

PO Box 7261
Mount Annan
NSW 2567
Ph -(0 2) 46477698

CERTIFIC ATE OF INSPEC TIO N-PRESSURE EQUIPM ENT

SAFE TO O PERATE

C e rtificate No-ABVC 44401

Re q uired by law- WHS Reg 2011 Cl 246 (2)

Boiler/ Ve sse l ID No- 373•8·186

Location of ID No- UPPER COMP RING

Hazard Le vel- B WORKCOVER/SAFE REG NO- B6-163564/12/0

This is to certify that I, DAVE HARMON (WHS Reg C la u se 267/ AS 3788 App V)

Inspected the- **EAST COAST VERTICAL BOILER**

For- Client/ Owner- STATE WASTE SERVICES

Address- 9 KENOMA PLACE ARNDELL PARK NSW

Site Address Of Unit - AS ABOVE

Location On Site- FACTORY AREA

On the- 21ST APRIL 2018 Following Inspec tion Procedure No. QP10-21WT and am satisfied that the above boiler/ vessel and its fittings are deemed ***SAFE TO OPERATE*** up to a maximum pressure of-

SHELL- 1057KPA JACKET- **N/A** TUBE- N/A

conditional upon any comments/conditions stated below . This Inspection was- INTERNAL VT &. EXTERNAL VT

Next inspection due- **9TH APRIL 2019**

Next Minimum Mandatory Internal inspection Due- 9/4/2019

Additional testing, inspection, NDT required/ due- N/A

Boiler power- lOO0KW or, Vessel Volu me- 1640 Litres Estimated Se rial Number- VWT270612/615

Owners Plant ID Number- N/A Class Of Construction- AS1228 (REC TECHNICAL STANDARD)

Des Reg No- 6868-P-98

Safety Valves (SRVs) where fitted are inspected as part of this inspection in accordance with AS 3788 Cl 4.7.3. SRVs must be insp ec ted at yearly intervals in accordance with AS3788 Cl 4.7.3. Recommended replacement/ bench test for srvs **in- 2018** for comp liance with AS3788 Cl4.7.4.2. Vessel owner is responsib le for SRV compliance . SRV install date must be marked on valve

Other Comments/ Mandatory Re pairs (Ml - Commissioned Da s- 1/ 11/20 12

REFER TO GENERAL REQUIREMENT 8-BOILERS/VESSELS HAZARD LEVEL A,B,C MUST BE REGISTERED WITH THE REGULATORY AUTHORITY (IE WORKSAFE) BOILERS/VESSELS HAZARD LEVEL A,B,C,D MUST HAVE DESIGN REGISTRATION WITH THE REGULATORY AUTHORITY (IE WORKSAFE) · BOILERS/ VESSELS MAY NOT BE ABLE TO BE REGISTERED IF OWNER CAN NOT PROVIDE CORRECT DATA .PLEASE FORWARD COPIES OF DESIGN REGISTRATION CERTIFICATES TO ABV INSPECTIONS

INSPECTION TYPE- P.E- PERIODIC INSPECTION AS 3788 CL 4.4- {EXCLUDES INSTALLATION/ MANUFACTURE DEFECTS WHERE APPLICABLE)

INSPECTION LIMITATIONS/ EXC LUSIONS - INSULATED VESSEL- SECTIONS BELOW INSULATION

GENERAL OVERALL CONDITION OF VESSEL-4- GOOD CLIENT TASK/ JOB NO - NIA

CO NTENTS- STEAM- HG

BOILER IN VERY GOOD CONDITION-NIL DEFECTS PRESENT

WATERSIDE OF BOILER IS IN VERY GOOD CONDITIO N. MAINTAIN CURRENT WATER TREATMENT AND SLO WDOW N PROCEDURES .

ATTENDANCE CATEGORY-UNATTENDED. SUPERVISION BY- TRAINED PERSO N. SUPERVISION & MAINTENANCE MUST BE IN ACCORDANCE WITH AS2593 TABLE I SECTION 1.

SAFETY VALVE/$ ARE OUT OF DATE IN ACCORDANCE WITH AS 3788 CL 4.7.4.2 RECOMMEND THAT VALVE/$ BE REPLACED OR OVERHAULED & BENCH TESTED, SET AT OR BELOW DESIGN PRESSURE OF VESSELAND RECOMMEND THAT IN STALL DATE BE MARKED ON VA LVE. IF VALVE NOT REPLAC ED / OVERHAULED BENCH TESTED UNIT WILL NOT BE CERTIFIED AT NEXT INSPECTION.

E] M and a torv Reoairs/ Modifications Reauired {C ondition a l C ertific a te Issued!
Repairs required ore outlined *on* attached correlating report No ABVR *4440* I
Mandatory repairs must be carried out
O Re- Inspection or confirmation of repairs/ modifications required

Inspector Signature-

NATA Signa tory-

WO RK HEALTH AN D SAFETY ACT 2011
WORK HEALTH AND SAFETY REGU LATION 2011
AS/ NZS 3788-2006- Pressure Eq uipmen t In-Se rvice Inspec tion

Accredited For Compliance with ISO/ IEC 17020

GENERAi REQUIIEMENTS

"Sofe To Op era te"-Meons 011 i dentified hazards !hot may affect the safe ope ra tion of the plant hove been adequately controlled
"Recommend" - Meons advice or suggestions os o course of action . "Manda tory"- Means as required by low *or* rules

t -Th is Certificate / insoection stoi us must be accessible at oil times- AS3873 Bl I
2- ThisC ertificate is cancelled when the boiler/ pressl.Ke v esset is moved or dimontled for erection at another site
3- The Ow ner is to hove the Boner/ Pressure Vessel suitobty prepared *tor* the In-Service Inspector-AS 3788 Appendix C
4- The Boiler / Pressure Vessel is to be operated only while maintained in a safe condition wrth its fitt ings in correct ad justment and . where necessory by Certified Paw ns.
S.All Proposed ma jor Repa irs. olterotio ns, disposal of or damage to the Boil er/ Pressure Ves.sel or in jvry lo any person from such damage is to be reported by the Owner to ABV Inspections 6-
The Boiler / Pressure Vessel ID No and/or Registered No is to be kept clean and diltincf.
7- This Cert i ficate is vo d on c ondition of payment of the inspection ree.
8- item Reg istrat ion of Pressure Vesselshazard level A.B.C with Worksofe is mandatory . Design Regis tration of Pressure.Ves,sels hazard level A,8.C.D with Worb:afe is mandatory. Pressure Vessels MUST NOT be used unless correc tty reg istered Registration with the regulatory authority is the responsibility of the OWNER Of PRESSURE EQUIPMENT. Penalties of up to$ 100.000 apply for eoch urvegistered item of pkInt- WHS ACT 2011 Section 42. Item reg;slro t;on number must be mor<ed on the ;tern of plant - WHS Reg 2011 Ct 273 (4)- PLEASE CONTACT A8V INSPECTIONS IF YO U REQUIRE ANY ASSISTANCE OR ADVICE WITH REGISTRATIONS.
9-Hol waler bo iJers (tired heaters) inspected in accordance with AS1200 E2.8/ AS 3788 Tobie 4.1 sect 4.
10-This Certif ica te is not valid unless all comm en ts.conditions .instruction s stated abo ve, or where siated on any attached C01Teloting documents referenced above ore complied with
1 \ - N o n Mandatory (HI D.E) \m.pec tions / Re-ins pec ti o ns onty carried out when spe c i ficalty reques ted by customer / customers representative.

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NATA 18641
PO Box 7261
Mount Annan
NSW2567
Ph-(02) 46477698

Test Spec- AS 3788- 2006

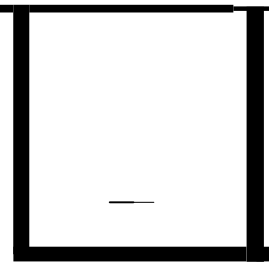
INSPECTION REPORT-PRESSURE EQUIPMENT

ReportinaccwithAppendixK

Report No- **ABVR** 44399 **Workcover/ Worksafe Reg No-** U6-163489/12/0 **Boiler/ Vessel Id No- 373-U-1242**

Client/ Owner- STATE WASTE SERVICES
Address- 9 KENOMA PLACE ARNDELL PARK NSW
Boiler/ Vessel- HORIZONTAL AUTOCLAVE
Location of ID No- DATA PLATE Inspection Procedure- QP10-39ST
Location On site- FACTORY AREA
Inspection **Mode-** P.E- PERIODIC INSPECTION AS 3788 CL 4.4- (EXCLUDES INSTALLATION/ MANUFACTURE DEFECTS WHERE APPLICABLE)

Inspection- INTERNAL VT & EXTERNAL VT
Inspection Date- 21ST APRIL 2018 Next Inspection Due- 9TH APRIL 2020
Next Minimum Mandatory Internal Inspection Due- 9/4/2022
Client Job/ task No- N/A
Additional Testing, Inspections, NOT Required/ Due- *N/A*



Owners Plant ID No- N/A
ID IMAGE ONLY-MAY BE FROM PREVIOUS INSPECTION

Vessel Manufacturer- BONDTECH **Hazard Leve/-** B **Serial Number-** W11-1206
Des Reg No- PV6-160155/12
Class- ASME SECTION VIII DIV 1 **Commissioned Date-** 1/11/2012
Design Pressure- SHELL- 448KPA **JACKET- N/A** **TUBE- N/A**
Working Pressure- SHELL- DATA UNAVAILABLE **JACKET- NIA** **TUBE- N/A**
(Vessels only)- Volume- 10387 **Litres** "Estimated **OT-** 260 deg c **Model Number/ Type-** NO MODEL NO
(Boilers Only)- Boiler Power- N/A **Boiler attendance status-** n **Attended** n **Limited Attendance** O **Unattended**

Procedure Ref No	Inspection Area	Sat	Un sat	N/A or Not Inspected	Procedure Ref No	Inspection Area	Sat	Un sat	N/A or Not Inspected
1	Internal- Shell				22	Damper			
2	External- Shell				23	Internal Coating			
3	Ends				24	Internal-Ano des			
4	Pressure Gauge				25	External- V\elds			
5	Drain/ Slowdown Valve				26	Internal- Nozzles			
6	External- Supparts				27	External- Insulation / Coating			
7	Flanges and Bolting				S8EEn: L I;I SEl;Cl IQ Q8I8-SB S 1 se1;c;r1;0 85 JZIIII CLH J				
8	Tube Plates				28	SRV/S-ohaul/ replace due 2018			
9	Tubes				29	SRV Set Press ure (corr ect) 345KPA			
11	Stays				30	SRV/S Sizing (correct) 2It,.1r.H			
11	Supert,eater				*31*	SRV 1ID No- (list)	*N/A*		
12	Furnace				*32*	SRV 2 IID No- (list)	*N/A*		
13	Headers				General Observations on Boiler and Boiler House-				
14	Gauge Glasses				*N/A*				
15	Low Water Control								
11	Injector or Pumps				UT Results (Representativ Figures)			D/U	
17	F l ame Failure Device							D /U	
18	M anual Reset				Mandatory Repairs/ Modifications Required			n	
19	Main Stop				ATNEXT SERVICE				
20	Feed Check				Re- Inspection or confirmation of Repairs/ Modifications required			I J	
21	Explos ion Door				New Safe To Operate Certificate Issued *			I., I	

Sat• Satisfactorv/Unsat- Unsatisfactorv • NOTE- (Pressure Eciulpment must not be operated unless it has a current "Safe To Operate" certificate

Other Comments/ Mandatocy Repairs IM}-

INSPECTION LIMITATIONS/ EXCLUSIONS- NONE

GENERAL OVERALL CONDITION OF VESSEL- 3- SATISFACTORY
CONTENTS-STEAM-HG

SAFETY VALVE/SARE OUT OF DATE IN ACCORDANCE WITH AS 3788 CL 4.7.4.2 RECOMMEND THAT VALVE/S BE REPLACED OR OVERHAULED & BENCH TESTED, SET AT OR BELOW DESIGN PRESSURE OF VESSEL AND RECOMMEND THAT INSTALL DATE BE MARKED ON VALVE.[M]
INTERNAL SURFACES OF AUTOCLAVE ARE IN VERY GOOD CONDITION. MAINTAIN CLEANLINESS INSIDE AUTOCLAVE WHERE POSSIBLE

INSPECTOR- Dave Harmon **SIGNATURE-** **DATE- 21ST APRIL 2018**
Accredited For Compliance with 1SO/ IEC 17020

NATA SIGNATORY-

(A) 1729

DOCUMENT NO. FN10-12
REVISED DATE - JULY 2017

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NATA
PO Box 7261
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NSW2567
Ph - (02) 46477698

Test Spec- AS 3788- 2006

INSPECTION REPORT-PRESSURE EQUIPMENT

ReportinaccwithAppendixK

Report No- **ABVR** 44399 Workcover/ Worksafe Reg No- U6-163489/12/0 Boiler/ Vessel Id No- 373-U-1242

INSPEC TO R- Dave Harmon **SIG N ATURE -** **DATE- 21ST APRIL 2018**

Accredited For Compliance with ISO/ IEC 17020

NATA SIGNATORY-

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NATA

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Mount Anno n
NSW 2567
Ph -(02) 464 77698

Test Spec- AS 3788- 2006

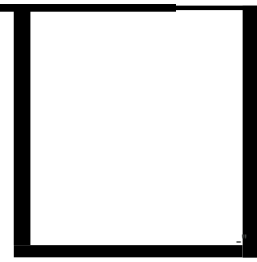
INSPECTION REPORT- PRESSURE EQUIPMENT

ReportinaccwithAppendixK

Report No- ABVR 44400 **Workcover/ Worksafe Reg No-** US-163488/12/0 **Boiler/ Vessel Id No- 373-U-1243**

Client/ Owner- STATE WASTE SERVICES
Address- 9 KENOMA PLACE ARNDELL PARK NSW
Boiler/ Vessel- VERTICAL AIR RECEIVER
Location of ID No- TOP ENDOF SHELL Inspection Procedure- QP10-42AR
Location On site- FACTORY AREA
Inspection **Mode-** P.E- PERIODIC INSPECTION AS 3788 CL 4.4- (EXCLUDES INSTALLATION/ MANUFACTURE DEFECTS WHERE APPLICABLE)

Inspection- EXTERNAL VT & UTK TESTED (INTERNAL EQUIV-AS3788 CL 4.4.1.3)
Inspection Date- 21ST APRIL 2018 **Next Inspection Due-** 9TH APRIL 2020
Next Minimum Mandatory Internal Inspection Due- (OR UT)-9/4/2022
Client Job/ task No- N/A
Additional Testing, Inspections, NDT Required/ Due- NIA



Owners Plant ID No- N/A
IDIMAGE ONLY-MAY BE FROM PREVIOUS INSPECTION

Vessel Manufacturer- BROWNYS ***Hazard Level-*** C ***Serial* Number-** 012-1562
Des Reg No- SD20080954-1
Class- AS1210-3 (REC TECHNICAL STANDARD) **Commissioned Date-** DATA UNAVAILABLE
Design Pressure- SHELL-1200KPA **JACKET- N/A** **TUBE- N/A**
Working Pressure- SHELL- 900KPA **JACKET- N/A** **TUBE- N/A**
(Vessels only)- Volume- 131 **Litres** •Estimated **DT-** 150 deg c **Model Number/ Type-** NO MODEL NO
(Boilers Only)- Boiler Power- N/A **Boiler attendance status-** 11 Attended n Limited Attendance n Unattended

Procedure Ref No	Inspection Area	Sat	Un sat	N/A or Not Inspected	Procedure Ref No	Inspection Area	Sat	Un sat	N/A or Not Inspected
1	Internal- Shell				22	Damper			
2	External-Shell				23	Internal Coating			
3	Ends				24	Internal-Anodes			
4	Pressure Gauge				25	External- Welds			
5	Drain/ Slowdown Valve				26	Internal- Nozzles			
6	External-Supports				27	External- Insulation/ Coating			
7	Flanges and Bolting				S8EEn'. Il.81 E It:,ISEECIIQt:,I Q8I8·SB S It:,ISEECIEQ-8S:IZ!!I CI H :I				
8	Tube Plates				28	SRV/S-Ohau l/replace due 2022			
9	Tubes				29	SRV Set Pressure (correct) 1100KPA			
11	Stays				30	SRV/S Sizing (correct) 3/8 INCH			
11	Superheater	n			31	SRV 1ID No- (list)	NIA		
12	Furnace				32	SRV 2 IID No- (list)	NIA		
13	Headers				General Observations on Boiler and Boiler House-				
14	Gauge Glasses				*NIA*				
15	Low Water Control								
-S	Injector or Pumps								
17	Flame Failure Device				UT Results (Representative Figures)		SHELL- 4.0MM END- 3.0MM		
13	Manual Reset				Mandatory Repairs/ Modifications Required				n
19	Main Stop								
20	Feed Check				Re- Inspection or confirmation of Repairs/ Modifications required				LJ
21	Explosion Door				New Safe To Operate Certificate Issued•				

Sat- Satisfactory/ Unsat- Unsatisfactory •NOTE- (Pressure Eauioment must not be ooerated unless it has a current "Safe To Ooerate" certificate

Other Comments/ Mandatory Repairs IMI-
I NSPECTIONLIMITATIONS/ EXCLUSIONS- NONE

GENERAL OVERALL CONDITION OF VESSEL- 3- SATISFACTORY
CONTENTS- AIR, COMPRESSED- NHG
NEW SAFETY VALVE FITTED 2 018 .

INSPECTOR- Dave Harmon **SIGNATURE-** DATE- 21ST **APRIL 2018**
Accredited For Compliance with ISO/ IEC 17020

NATA SIGNATORY-

(A) 1729

DOCUMENT NO. FN10-12
REVISED DATE - JULY 2017

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PO Box 7261
NATA Mount Annan
NSW2567
Ph -(02) 46477698

Test Spec- AS 3788- 2006

INSPECTION REPORT- PRESSURE EQUIPMENT

ReportinaccwithAppendixK

Report No- ABVR 44400 **Workcover/ Worksafe Reg No-** US-163488/12/0 **Boiler/ Vessel Id No- 373-U-1243**

INSPECTOR- Dave Harmon **SIGNATURE-** **DATE- 21ST APRIL 2018**

Accredited For Compliance **with ISO/** IEC **17020**

NATA SIGNATORY-

(A) 1729

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Ph-(02) 46477698

NATA 18641

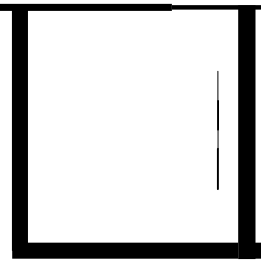
Test Spec- AS 3788- 2006

INSPECTION REPORT- PRESSURE EQUIPMENT

ReportinaccwithAppendixK

Report No- **ABVR** 44401 **Workcover/ Worksafe Reg No-** 86-163564/12/0 **Boiler/ Vessel Id No- 373 -B- 186**

Client/ Owner- STATE WASTE SERVICES
Address- 9 KENOMA PLACE ARNDELL PARK NSW
Boiler/ Vessel- EAST COAST VERTICAL BOILER
Location of ID No- UPPER COMP RING Inspection Procedure- QP10-21WT
Location On **site-** FACTORY AREA
Inspection **Mode-** P.E-PERIODIC INSPECTION AS 3788 CL 4.4- (EXCLUDES INSTALLATION/MANUFACTURE DEFECTS WHERE APPLICABLE\



Owners Plant ID No- NIA
10 IMAGE ONLY-MAY BE FROM PREVIOUS INSPECTION

Inspection- INTERNAL VT & EXTERNAL VT
Inspection Date- 21ST APRIL 2018 **Next** Inspection Due- 9TH APRIL 2019
Next Minimum Mandatory Internal Inspection Due- 9/4/2019
Client Job/ task No- N/A
Additional Testing, Inspections, NOT Required/ Due- N/A

Vessel Manufacturer- EAST COAST **Hazard Level-** 8 **Serial Number-** *VWT2706121615*
Des Reg No- 6868-P-98
Class- AS1228 (REC TECHNICAL STANDARD) **Commissioned Date-** 1/11/2012
Design Pressure- SHELL-1057KPA **JACKET-** N/A **TUBE-** N/A
Working Pressure- SHELL- 650KPA **JACKET-** N/A **TUBE-** N/A
(Vessels only)- Volume- 1640 **Litres** 'Estimated **DT-** 250 deg c **Model Number/ Type-** ECS1000VWT
(Boilers Only)- Boiler Power- 1000KW **Boiler attendance status-** n **Attended** n **Limited Attendance** M **Unattended**

Procedure Ref No	Inspection Area	Sat	Unsat	N/A or Not Inspected
1	Internal- Shell			
2	External- Shell			
3	Ends			
4	Pressure Gauge			
5	Drain/ Slowdown Valve			
6	External- Suppa rts			
7	Flanges and Bolting			
8	Tube Plates			
9	Tubes			
11	Stays			
11	Superheater	n	n	M
12	Furnace			
13	Headers			
14	Gauge Glasses			
15	LowVVater Control			
16	Inj ector or Pumps			
17	Flame Failure Device			
18	Manual Reset Main Stop			
19				
20	Feed Check			
21	Explosion Door			

Procedure Ref No	Inspection Area	Sat	Unsat	N/A or Not Inspected
22	Damper			
23	Internal Coating			
24	Internal-Anodes			
25	External-1/\Aelds			
26	Internal- Nozzles			
27	External- Insulation/ Coating			
	S8EEn:)I.81IIE I SEECIIQ □8I 8 - SBII S I SEECI E□- 8 5 ;ma CI Z J			
28	SRV/S-ohaul/ replace due 2018			
29	SRV Set Pressure (correct) 1050KPA			
30	SRV/S Sizing (corr ect) 2 INCH			
31	SRV 1ID No- (list)	N/A		
32	SRV 2 IID No- (list)	N/A		

General Observatioris on Boiler and Boiler House-
N/A

UT Results (Representative Figures)	D/U
	D/U
Mandatory Repairs/ Modifications Required	n
Re- Inspection or confimiation of Repairs/ Modifications required	0
New Safe To Ooerate Certificate Issued •	

Sat- Satisfactorv/Unsat- Unsatisfactorv • NOTE-(Pressure Equipment must not be operated unless it has a current "Safe To Ooerate" certificate

Other Comments/ Mandatory Repairs {MI-

INSPECTION LIMITATIONS/ EXCLUSIONS- INSULATED VESSEL- SECTIONS BELOW INSULATION

GENERAL OVERALL CONDITION OF VESSEL- **4**- GOOD
CONTENTS-STEAM-HG

BOILER **IN** VERY GOOD CONDITION-NIL DEFECTS PRESENT
WATERSIDE OF BOILER IS IN VERY GOOD CONDITION. MAINTAIN CURRENT WATER TREATMENT AND SLOWDOWN PROCEDURES.
ATTENDANCE CATEGORY-UNATTENDED. SUPERVISION BY- TRAINED PERSON. SUPERVISION & MAINTENANCE MUST BE IN ACCORDANCE WITH AS2593 TABLE 1 SECTION 1.
SAFETY VALVE/SARE OUT OF DATE **IN** ACCORDANCE WITH AS 3788 CL 4.7.4.2 RECOMMEND THAT VALVE/S BE REPLACED OR OVERHAULED & BENCH TESTED , SET AT OR BELOW DESIGN PRESSURE OF VESSEL AND RECOMMEND THAT INSTALL DATE BE MARKED ON VALVE. IF VALVE NOT REPLACED / OVERHAULED BENCH TESTED UNIT WILL NOT BE CERTIFIED AT NEXT INSPECTION.

INSPECTOR- Dave Harmon **SIGNATURE-** **DATE- 21ST APRIL 2018**
Accredited For Compliance with 1S0/ IEC 17020

NATA SIGNATORY-

(A) 1729

DOCUMENT NO. FN10·12
REVISED DATE - JULY 2017

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NATA
PO Box 7261
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NSW2567
Ph-(02) 46477698

Test Spec- AS 3788 - 2006

INSPECTION REPORT- PRESSURE EQUIPMENT

Repo rtin acc with App en dix K

Report No- ABVR 44401 Workcover/ Worksafe Reg No- B6-163564/12/0 Boiler/ Vessel Id No- **373-8-186**

INSPECTOR- Dave Harmon **SIGNATURE-** **DATE- 21ST APRIL 2018**

Accredited For Compliance with 150/ IEC 17020

NATA SIGNATORY-

Gmail **Nicolas Israel <20nicolas15@gmail.com>**

FW: Med X - C177985 - 9 Kenoma Place Arndell PArk

1 message

Chris Liney <chris@statewaste.com.au> Wed, Jun 6, 2018 at 11:52 AM
To: Nicolas Israel <20nicolas15@gmail.com>

Gas tank details as requested

Regards

Chris Liney

MED-X trading as State Waste Services

P: 1300 462 720

F: 1300 462 705

M: +61 (0)448484848

W: www.statewaste.com.au

From: Azra Kalaba [mailto:AzraKalaba@supagas.com.au]
Sent: Wednesday, 6 June 2018 11:48 AM
To: Chris Liney <chris@statewaste.com.au>
Subject: FW: Med X - C177985 - 9 Kenoma Place Arndell PArk

Dear Chris,

Please find attached Information requested.

Kind Regards,

Azra Kalaba
Customer Service Supervisor

SUPAGAS
YES WE CAN!

D: 02 8788 4479 **F:** 02 8788 4445
5 Benson Road, Ingleburn NSW 2565
E: AzraKalaba@supagas.com.au
W: www.supagas.net.au

Subject: FW: Med X - C177985 - 9 Kenoma Place Arndell PArk

The 2 yearly inspection report as per attached, the serial number for the tank is 7.5KL-SU-617

1. Internal Inspection due Jan 2020
2. 2 yearly inspection due March 2019
3. Vessel registered with SafeWork until March 2019

If you require further information, please let me know.

Saroj Sharma
Maintenance Scheduler

D: 02 8788 4470 **F:** 02 8788 4445
5 Benson Road, Ingleburn NSW 2565
E: SarojSharma@supagas.com.au
W: www.supagas.net.au

2 attachments

7.5KL-SU-617 EXT INSP MAR 17.pdf
211K

7.5KL-SU-617 - Cert of Reg Exp 22.03.2019.pdf
79K