Safety Engineering & Technical Services Pty Ltd

***W**ORKPLACE **H**EALTH, **S**AFETY & **E**NGINEERING **C**ONSULTANTS*

ABN: 90 003 112 945

02 May 2018

The Manager – Project Management
Savills
Level 25, 1 Farrer Place
SYDNEY NSW 2000

Attention: Mr James Collins – Project Manager

Dear Sir,

re: Hazardous Chemicals & Planning Matters –Opinion on the Applicability of SEPP 33 in Support of a Development Consent Application for the Proposed North Shore Health Hub – Tower B, St Leonards Stage 2 Design & Construction Project (SSD 8894)

This letter of advice has been prepared pursuant to your request to prepare a risk screening report that provides opinion as to whether State Environmental Planning Policy 33 (SEPP33) applies to the proposed Tower B - Stage 2 Design and Construction as part of the North Shore Health Hub ("NSHH") to be built in the general precinct of North Shore Private Hospital.

EXECUTIVE SUMMARY

In the *Response to Submissions* advice received from the NSW Department of Planning & Environment dated 13 April 2018, the following direction was given

Hazards

1. Perform a preliminary risk screening in accordance with *State Environmental Planning Policy No. 33- Hazardous and Offensive Development (SEPP33)* and the Department's *Applying SEPP 33 Guidelines.* As part of the preliminary risk screening, provide a clear indication of the Class, quantity, and location of all dangerous goods and hazardous materials associated with the proposed development.

Pursuant to this direction this advice has been prepared based on:

- the E*nvironmental Impact Statement – for Tower B, St Leonards: Stage 2 Design & Construction,* prepared by Keylan Consulting Pty Ltd dated February 2018

- a review of the drawings of Tower B as listed in Appendix C of this report
- the technical report *North Shore Health Hub – Operational Waste Management Plan - February 2018*, prepared by Waste Audit & Consultancy Services (Aust) Pty Ltd
- a previous report *Hazardous Chemicals & Planning Matters –Opinion on the Applicability of SEPP 33 in Support of a Development Consent Application for the Proposed Private Hospital – St Leonards Project (SSD 7543),* dated 5 June 2017
- the NSW DP&E document *Applying SEPP* 33 - 2011

The report concludes that the proposed consolidated development of Tower A and Tower B activities does not trigger any of the thresholds for SEPP 33 to apply.

A DESCRIPTION OF THE FACILITIES RELEVANT TO THIS REPORT

The North Shore Health Hub is a proposed new building to be located at the intersection of Reserve Road and Westbourne Street, St Leonards within the heart of the Lower North Shore medical precinct, which includes the existing North Shore Private Hospital, the Kolling Institute of Medical Research Building (adjacent), and Royal North Shore Hospital.

This report is in respect of a Stage 2 development application (DA) for the concept proposal DA for a new building (known as Tower B) for medical specialist suites and associated allied health uses.

Tower B is an addendum to the proposed Tower A building, being constructed on the podium of Tower A, with a common lobby to enable transfer of patients between the two towers. Further, Tower A includes a first floor pedestrian bridge over Reserve Road to provide direct access between the health hub and the existing private hospitals and the transfer of patients between buildings for treatment and aligning of hospital medical and surgical services.

The concept proposal DA (SSD 8499) is currently under assessment and seeks approval for:

- a building envelope and indicative uses for Tower B that would be constructed on the podium of Tower A (SSD 7543)

- indicative uses comprising medical consulting rooms, and other ancillary uses such as conference rooms and a gymnasium.

This report considers the further refinement of this concept proposal and is in respect of the construction and use of Tower B, situated on the northern and eastern sides of the 2-storey podium of Tower A (SSD 7543) on the site.

The new Tower B will:

- be 6- storeys in height
- have a gross floor area (GFA) of 7,000 m^2 (equivalent to a FSR of 1.1:1)
- accommodate health and medical purposes as part of the proposed North Shore Health Hub (Towers A and B) and ancillary to the Royal North Shore Hospital and North Shore Private Hospital, including medical specialist suites and associated allied health uses such as:
    - Urology;
    - Plastic and reconstructive surgery;
    - Respiratory and sleep disorder clinics
    - Ophthalmology (eye surgery);
    - Gastroenterology;
    - Colorectal;
    - Orthopaedic;
    - Cardiology;
    - Cardiothoracic;
    - Paediatrics;
    - Obstetrician gynaecologist services;
    - General surgeons;
    - Ear Nose and Throat;
    - IVF;
    - Laser treatments;
    - Rehabilitation;
    - Allied health;
    - Dermatology;
    - Physiotherapy.

MANDATED PLANNING REQUIREMENTS REQUIRING PROPONENTS TO DEMONSTRATE HAZARDOUS CHEMICAL SAFETY

By addressing the items specified in the SEARs, the proponent is required to properly consider specific hazards in order to provide an assurance that the design of the facilities is fit-for-purpose and adequate to maintain an acceptable level of safety.

As an integral component of this, a process is mandated for ensuring that all the implications of the intended usage of hazardous chemicals are fully described and properly considered before any consent is granted.

Certain high hazard activities are additionally required to undergo a more rigorous process of safety assurance than others of inherently lower risk potential as part of the development consent process. These high hazard activities are identified by a screening process pursuant to a planning instrument, State Environmental Planning Policy 33 (SEPP 33). All development proposals are required to determine whether SEPP 33 applies.

OPERATING WASTES STREAMS

This advice draws on the Waste Management Plan that was prepared in support of SSD 7543. This Plan describes waste management policies and procedures (that will apply to the North Shore Health Hub - including Tower B).

I am advised that:

- no chemical waste will be generated in (or by) the facilities to be provided by the proposed project works
- no tenancy agreements have been negotiated for any nuclear medicine facilities, however it can be reasonably anticipated that they will be part of the health hub activities.

Other than chemical wastes that are dangerous goods (of which there are none for the proposed development activities), the only wastes that impact on the applicability of SEPP 33 are clinical wastes.

Four **Clinical Waste** sub-streams will be generated:

- **Anatomical Waste** (human tissue) double–bagged and collected in a 240 L

bin –these wastes are to be picked up by an approved waste transport contractor and incinerated (in a high temperature furnace)

- **Clinical Wastes** (referred to in this report as Clinical Wastes - Other) are collected in 120 L & 240 L bins picked up, for autoclaving before being buried in landfill
- **Sharps** collected in yellow purpose designed containers – the proposed arrangement is to enter into a contractual arrangement for re-usable bins on an exchange basis – the contractor to be a licensed transporter and waste disposal facility – sharps are to be autoclaved and then disposed of to landfill
- **Cytotoxic Wastes** – in 240 L bins - the current practice is to put all collected cytotoxic sharps containers into these bins for disposal – to be picked up under contract and incinerated

The Waste Management Plan has assessed the waste volume for the total Hub development (Table on top of Page 6) from which the following can be deduced.

Material Stream	Daily volume	Bin Size	Bins	Cleared	Capacity	Weekly	Weekly mass (1)
	m^3	L			m^3	m^3	kg
Clinical Waste	0.91	240	10	3 x week	2.4	4.57	450
Sharps	0.02	20	5	As required	0.10	0.06	6 (2)
TOTAL	0.93				2.5	4.04	456

Table 1 – Wastes – quantities

Notes: (1) Mass to volume factor has been determined from measurements of all classes of clinical wastes for a development consent application for The Sutherland Hospital in 2015 (mass of 1 x 240 L bin = 15 kg)

(2) This figure is the net mass of the contents of sharps containers – it being assumed that the containers are generally recyclable after autoclaving.

(3) In the previous report by SETS Pty Ltd for the 1st Stage development, a typical clinical waste breakdown as reported by The Sutherland Hospital (a hospital with an Emergency Department)in 2015 was:

Sharps 20.4% Anatomical wastes 1.5%
Cytotoxic wastes 1.0% Other clinical wastes 77.1%

The waste management plan does not describe the disposal protocol for clinical wastes – the only stream that may trigger SEPP 33. It is my understanding that:

Waste type	Description	Comment
Contaminated waste including sharps and Clinical Waste	Anatomical (human tissue) waste collected in colour coded bins (yellow with a burgundy lid) held in the departments	• All anatomical wastes are to be incinerated at high temperature at a licensed waste disposal facility
	Clinical waste in 120 L & 240 L bins (may include sharps containers – yellow that are placed in clinical waste bins for disposal)	• Assume at worst all wastes classified as Class 6.2 infectious waste • These clinical wastes are autoclaved and disposed of at a licensed land-fill activity
	Cytotoxic Waste materials including sharps contaminated with a cytotoxic drug	• Cytotoxic waste is to be collected in colour coded bins. - these will be collected daily and stored in a separate enclosure at the loading dock for collection - waste is then collected by a contracted company for incineration • Maximum stored inventory based on 7 days accumulation is < 5 kg • Assume at worst case all cytotoxic waste is classified as dangerous goods Class 6.1 PG II • These clinical wastes are to be incinerated at high temperature at a licensed waste disposal activity

Table 2 – Disposal protocol for clinical wastes

THE APPLICABILITY OF STATE ENVIRONMENTAL PLANNING POLICY 33 (SEPP 33) TO THE PROPOSED NSHH, ST LEONARDS PROJECT

State Environmental Planning Policy (SEPP) 33 is an enabling instrument that links safety and pollution control performance, to the permissibility of a development proposal.

SEPP 33 applies to proposals that fall under the policy's definition of:

- '**potentially hazardous industry**' - where the quantities of dangerous goods or transport movements involving dangerous goods exceeds the threshold limits described in the document *Applying SEPP 33*, or

- '**potentially offensive industry**' - a proposal that, in the absence of safeguards, would emit a polluting discharge which would cause a significant level of offence.

Assessing whether a proposal is potentially hazardous industry

The screening process relies on a sorting procedure related to the nature and quantity of dangerous goods present on the site of the proposed development.

Dangerous goods are a group of substances that have been recognised as having some immediate public safety threat due to their hazardous properties. Dangerous goods have been listed in a number of national and international publications (in Australia this list is set out in the *Australian Dangerous Goods Code* – currently in the 7th edition).

A system of classification and labelling of dangerous goods has been adopted throughout Australia which is consistent with systems used throughout most of the world. This system has been devised to help people quickly recognise dangerous goods and their properties and hazard potential.

All dangerous goods that are handled or transported must be accurately classified into classes that reflect their characteristics (it being the responsibility of the manufacturer or importing agent to ensure that the dangerous goods are accurately classified).

Dangerous goods are divided into nine '**classes'** (and in the case of dangerous goods of Classes 1, 2, 4, 5 and 6 these classes are further subdivided into '**divisions**'). Each 'class group' is comprised of substances which have similar properties or hazards. Goods having more than one hazardous property are classified under their primary class and where they have some additional hazard, they are also assigned a '**subsidiary risk**'.

An example occurring frequently in clinical areas such as the NSHH, St Leonards, is compressed oxygen which is assigned to Class 2 gases, Division 2.2, Sub risk 5.1, to indicate that not only is it a compressed non-flammable gas, but that it also has

oxidising properties (that render it capable of making say the severity of a fire situation, worse).

Substances within Classes 3, 4, 5, 6, and 8 are further subdivided into **Packing Groups** (abbreviated as PG) to indicate their relative inherent risk (PG I - high risk, PG II - moderate risk, and PG III - least risk).

The various dangerous goods classes are:
Class 1 – Explosives - are substances and articles used to produce explosions or pyrotechnic effects.

Class 2 – Gases - includes gases which are compressed, liquefied or dissolved under pressure. Some gases have subsidiary risk classes (i.e. other risk characteristics such as 'flammable' or 'corrosive'):

- Division 2.1 - Flammable gases are gases which ignite on contact with an ignition source (such as acetylene, hydrogen, LP gas)
- Division 2.2 - Non-flammable gases are gases which are neither flammable nor poisonous (such as oxygen, nitrogen, medical air, argon)
- Division 2.3 - Poisonous gases are gases liable to cause death or serious injury to human health if inhaled - such as ammonia, chlorine, carbon monoxide

Class 3 - Flammable liquids – are liquids which can be ignited and will burn on contact with ignition sources

C1 & C2 combustible liquids – are liquids that will burn (often fiercely) when they are heated and ignited – C1 combustible liquids are of relatively lower flashpoint and include liquids such as diesel fuel, olive oil and other vegetable oils while C2 combustible liquids have a high flashpoint and include substances such as lubricating and hydraulic oils

Class 4 - Flammable Solids – are solids that have characteristics that pose a risk of fire and/or explosion and includes:

- Division 4.1 - flammable solids that are easily ignited and readily combustible - such as nitrocellulose, phosphorus, matches, hexamine;
- Division 4.2 - spontaneously combustible substances - such as aluminium alkyls, white phosphorus);

- Division 4.3 - substances emitting a flammable gas when wet, or which react violently with water (such as aluminium phosphide, calcium carbide).

Class 5 – Oxidisers – are substances that can promote or exacerbate the effect of fire and include

- Division 5.1 - Oxidizing agents other than organic peroxides (such as calcium hypochlorite (pool chlorine), ammonium nitrate, hydrogen peroxide); and.
- Division 5.2 - Organic peroxides, (liquid or solid) (such as methyl ethyl ketone peroxide, benzoyl peroxides, cumyl hydroperoxide).

Class 6 – Toxic and Infectious Substances - (this classification does not include poisonous gases), and are further classified as being either:

- Division 6.1 - Toxic substances - which may be liquids or solid) and which are liable to cause death or serious injury to human health if inhaled, swallowed or absorbed through the skin (such as cyanides, arsenic compounds), or which are harmful to human health (such as low toxicity pesticides).
- Division 6.2 – are Infectious substances (such as vaccines, pathology specimens).

Class 7 – Radioactive Substances – are substances that either alone, or in a combination of substances, emit ionising radiation (such as uranium, radioisotopes).

Class 8 – Corrosives - are substances (either solids or liquids) which may harm living tissue or damage equipment - such as hydrochloric acid, sodium hypochlorite (liquid pool chlorine), sodium hydroxide, and lead acid batteries.

Class 9 - Miscellaneous Dangerous Goods - are substances that are not classified elsewhere but which are known to have a safety risk when being transported - such as molten naphthalene, molten bitumen, polyester beads, and lithium batteries.

Nature and quantities of dangerous goods being stored and handled at North Shore Health Hub, St Leonards (including Tower B)

A manifest of dangerous goods present at the premises in above placard quantities

(as prescribed in Schedule 11 of the NSW *Work Health and Safety Regulation 2011)* has been developed (see Appendix A)

The dangerous goods described in Appendix A include:

- small quantities of compressed oxygen in cylinders in either portable ready use units or G size back-up cylinders, nitrous oxide and other cylinders of compressed non-flammable and oxidizing gases
- flammable liquids (for the proposed development works these will be in small quantities only) — these could be goods of PG II & III
- Class 6.1 cytotoxic drugs (with small quantities of active ingredients) – the active component will be less than 1 kg, and cytotoxic contaminated waste is less than 5 kg/ week, and
- Class 6.2 infectious substances – the maximum quantity of clinical waste to be kept at the Hospital at any one time is about 456 kg (presuming a single weekly pickup in the worst instance).

It has been confirmed that no radioactive wastes of Class 7 (radioactive substances) are to be generated or kept in the building.

Based on the quantities of goods listed in Appendix A, and in accordance with the outcome of the screening method for potentially hazardous development summarised in Table 3 overleaf, the provisions of SEPP 33 do not apply to the proposed development.

SEPP 33 applies if	**SEPP 33 Threshold**	**Actual**
Class 2 non-flammable gases and cryogenic liquids exceed limit described in Table 1 in the section Risk Screening - Figure 9 of the document *Applying SEPP 33*	No limit is set for Class 2.2 gases	SEPP 33 - does not apply
Class 3 dangerous goods (flammable liquids) exceed the lower threshold limit) and are not sufficiently separated from the boundary by the distance given in the section Risk Screening - Figure 9 of the document *Applying SEPP 33*	In the case of Class 3 PG II/PG III flammable liquids, the lowest threshold limit below which SEPP 33 does not apply is 2,000 L if worst case of PG I goods is assumed	No flammable liquids above minor storage quantities as defined in Table 2.1 of AS 1940-2004 are to be kept in the Hospital – this is well below threshold quantities – SEPP 33 does not apply
Quantity of goods of Class 6.1 exceeds threshold limit	Threshold quantities: • 0.5 tonnes for PG I; • 2.5 tonnes PG II/III	No Class 6.1 (toxic substances) are to be kept in the Hospital –--- SEPP 33 does not apply
Class 7 radioactive substances	The Note to Table 1 of Chapter 7 of *Applying SEPP 33* states that Class 7 dangerous goods are excluded from the risk screening process - all proposals should demonstrate compliance with appropriate codes	As stated elsewhere in this report, all tenants setting up and operating nuclear medicine facilities that may be located within NSHH will comply with Code requirements
Quantity of goods of Class 8 exceeds threshold limit	Threshold quantities: • 5 tonnes for PG I • 25 tonnes PG II; • 50 tonnes PG III	NSHH will keep only very small quantities of cleaning chemicals (< 4 L per location) - quantities below threshold limit - SEPP 33 does not apply
Quantity of Class 6.2 clinical wastes exceeds threshold quantities	Threshold quantity is 0.5 tonne	SEPP 33 does not apply – in the worst case assuming only a single waste pick up in any week, the maximum quantity of clinical waste kept at any one time would not exceed 460 kg - i.e. no more than 500 kg is ever present

Table 3 – Applicability of SEPP 33 for potentially hazardous industry

SEPP 33 applies if	SEPP 33 Threshold	Actual
Number of significant transport movements meeting the specified criteria are exceeded	Number of traffic movements of dangerous goods greater than 1 tonne capacity exceed the frequencies set in the screening threshold	SEPP 33 does not apply – number of transport movements are below threshold limit (the only scheduled dangerous goods delivery vehicles above 1 tonne capacity are the bulk liquid oxygen supply tanker (twice per month), and the gas cylinder delivery truck ~ (once per week)

Table 4 – Applicability of SEPP 33 for potentially hazardous industry – transport considerations

Assessing whether a proposal is potentially offensive industry

The primary consideration in assessing whether any proposal falls within the 'potentially offensive industry' category is whether the consent authority is satisfied that there are adequate safeguards to ensure that any emissions from a facility can be controlled to a level at which they are not significant. Where proposed activities do not require a licence pursuant to protection of the environment legislation, or where they do require a licence but in the opinion of the environmental regulator the proponent can fully meet its licence requirements, a proposal is not deemed to be 'offensive industry'.

I am advised that no licence is required pursuant to the Chapter 3 of the *Protection of the Environment Operations Act* hence the proposed hospital is not potentially offensive development in accordance with the screening method for the application of SEPP 33.

Conclusion on the applicability of SEPP 33

As a consequence of being neither potentially hazardous nor potentially offensive industry, SEPP 33 does not apply to the proposed NSHH, St Leonards project.

SOME FURTHER COMMERNTS ON THE PROPOSED STORAGE, USE AND MANAGEMENT OF HAZARDOUS MATERIALS

The design of the facilities for the receiving, storage, handling and use of hazardous materials, and the proposed activities of the NSHH, St Leonards, will be in accordance with:

- the National Construction Code 2017
- the NSW *Work Health and Safety Act* 2017 and the Work *Health and Safety Regulation 2017* (particularly Chapter 7 – *Hazardous Chemicals)*
- the various standards relating to the storage and handling of specific classes of dangerous goods, including:
    - AS 1894-1997 *The storage and handling of non-flammable cryogenic and refrigerated liquids*
    - AS/NZS 4332-2004 *The storage and handling of gases in cylinders*
    - AS 1940-2017 *The storage and handling of flammable and combustible liquids*
    - AS/NZS 4452-1997 *The storage and handling of toxic substances*
    - AS 3780-2008 *The storage and handling of corrosive substances, and*
    - AS/NZS 4681-2000 *The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*
- standards covering the classification of hazardous areas that describe the spaces from which ignition sources must be excluded, particularly AS/NZS 60079.10.1- 2009 Explosive Atmospheres – *Part 10.1 : Classification of areas – Explosive gas atmospheres (IEC 60079-10-1, Ed. 1.0(2008) MOD)*
- the *Code of Practice – Managing risks of hazardous chemicals in the workplace – July 2014* – WorkCover NSW.

Radiation hazards

Diagnostic and clinical treatment radiation equipment are likely to be present and used in North Shore Health Hub.

A radiation consultant is to be engaged by the proponent in conjunction with the proposed Health Hub tenant and once the selection of diagnostic imaging equipment has been finalised, an expert report of the shielding requirements for the structure internally and surrounding this department will be prepared for coordination with the project manager.

Shielding requirements for imaging equipment is make/model dependant and is identified and specified by the equipment suppliers. When the equipment selection is finalised, then NSHH will follow all the shielding guidelines nominated by the equipment supplier/s.

The design will be developed so as to fully comply with the following Australian Standards:

- AS/NZS IEC 60601.1.3- 2015 – *Medical electrical equipment – General requirements for basic safety and essential performance – Collateral standard: Radiation protection in diagnostic X-ray equipment*
- AS 1319 – 1994 - *Safety signs for the occupational environment.*
- AS 2243.4 – 2017 - *Safety in laboratories. Part 4: Ionizing radiations*
- AS/NZS IEC 60825.1-2014 – *Safety of laser products – Equipment classification and requirements*
- AS/NZS IEC 60825.*14-2011 Safety of laser products - A users guide*
- AS/NZS 4173:2018 - S*afe use of lasers and intense light sources in health care.*
- AS/NZS 4543.1:1999 - *Protective devices against diagnostic medical X-radiation. Part 1: Determination of attenuation properties of materials.*
- AS/NZS 4543.2:1999 - *Protective devices against diagnostic medical X-radiation - Part 2: Protective glass plates.*

Adherence to these standards and to those listed earlier in relation to dangerous goods safety, ensures that the facilities and activities of North Shore Health Hub, St Leonards will be in accordance with best-practice achievable for a bio-medical clinical facility, and will secure an acceptable level of safety.

GENERAL CONCLUSION

As stated earlier in this advice, based on the information provided to me as described in this report, it is my opinion that SEPP 33 does not apply to the proposed North Shore Health Hub, St Leonards development proposal.

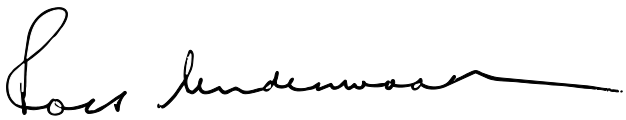
Further, the proposed facilities for the storage, handling and use of hazardous chemicals, will be designed and constructed in compliance with all relevant legislative requirements.

This is consistent with best practice principles for the management of risk to health and safety posed by the materials to be kept and used. It will therefore secure a level of safety and environmental performance described in the relevant standards and codes of practice applying to clinical facilities, thereby meeting deemed compliance with relevant statutory instruments and obligations.

Should you need to clarify any of this advice, or raise any other issues, I would be happy provide further assistance.

I thank you for the opportunity of providing advice in these matters.

Yours faithfully
Safety Engineering & Technical Services Pty Ltd



Ross Underwood, MIEAust, CPEng, MSIA, MAIDGC
General Manager

DISCLAIMER

This opinion in relation to the compliance of the proposed redeveloped facilities to be provided at North Shore Health Hub, St Leonards (including Towers A & B) was prepared impartially and the assessment completed independently by Safety Engineering & Technical Services Pty Ltd. The report reflects our best judgement based on the information available at the time of preparation. Any use that any party makes of the documentation, however, is the responsibility of such party. Safety Engineering & Technical Services Pty Ltd accepts no responsibility whatsoever for damages (if any) suffered by any party in reliance on information contained in this report.

APPENDIX A **List of dangerous goods storage depots (above WHS Regulation 2011 placard quantities) at the proposed North Shore Health Hub, St Leonards**

Room Name/Facility	DG Class	PG	Hazardous contents	Q'ty	Comments
Roofed gas cylinder store – compressed non-flammable and oxidising gases at Loading Dock – Level 1	2.2 & 2.2/5.1	-	Cylinders of air (Class 2.2) and nitrous oxide & oxygen (both Class 2, Division 5.1)	< 1,200 L water capacity of which < 1,000 L would be Class 2.2, Division 5.1	• A notional allowance for health-related consulting and procedure rooms • Back up supply of oxygen, and nitrous oxide used as an anaesthetic gas – also tool air • The quantities of gases are such that they may be kept under the minor storage provisions of Australian Standard AS 4332-2004 – *The storage and handling of gases in cylinders* • some medical consulting suites may have need for single + spare cylinders – this is permissible as Minor Storage provided that at least 5 m separation is available between cylinder locations
Flammable liquid storage cabinets – Depot 03 – Store Room on Level 1	3	II/III	Flammable liquids (hand gel sanitiser)	2 x 450 L	• A notional allowance for health-related consulting and procedure rooms being for 2 x 450 L cabinets (or a combination of cabinets of aggregate capacity of 450 L) containing ethanol- based hand sanitising gel and wipes to be kept in accordance with AS 1940-2017 – Section 4
Waste Disposal Room on Level 1	6.2	II	Clinical wastes (UN 3291)-– Waste Sharps	6 kg per week	• Pick up frequency will be at least once per week by a licensed transport contractor – sharps will be autoclaved and buried in an approved land-fill
		II	Clinical wastes (UN 3291) – Anatomical Waste	6.8 kg per week	• The usual practice in major hospitals is for anatomical waste collected daily and conveyed to the Loading Dock for daily pick up 5 days per week by a licensed waste transport contractor – disposal is by incineration at an approved facility
		II	Clinical wastes (UN 3291)– Cytotoxic -	4.6 kg per week	• Pick up frequency will be at least once per week by a licensed transport contractor – disposal is by incineration at an approved facility

Room Name/Facility	DG Class	PG	Hazardous contents	Q'ty	Comments
		III	Clinical wastes (UN 3291) – Other	438.7 kg per week	• The usual practice in major hospitals is for clinical waste to be collected daily and conveyed to the Loading Dock for daily to be pick up 5 days per week by a licensed waste transport contractor – disposal is by incineration at an approved facility – this practice will be followed by NSHH
Emergency Generator Fuel Tank	C1 Flammable liquid Category 4 (GHS)	-	Diesel fuel – reserve fuel supply for the emergency generator	4,000 L	• this tank would be an above-ground tank in a fire-rated tank chamber as specified in AS 1940-2017 – Section 5

NOTES:

Note 1. Definitions: PG - Packing Group – a measure of the relative hazard of a dangerous good of Class 3, 4, 5, 6, 8 & 9 – *(PG I goods are those of highest hazard, PG II goods are of moderate hazard, and PG III are goods of relatively low hazard)*

NCADG Not classified as dangerous goods

Minor storage is a concept incorporated in all the relevant standards for keeping the various classes of dangerous goods. Minor storage recognizes that for small quantities of dangerous goods and where the goods are sufficiently dispersed, the presence of the dangerous goods adds marginally little to the overall hazard of the proposed facility and/or its activities*).*

Note 2. Waste Quantities (assumptions) – based on the tabulation provided in Appendix B

(a) Clinical wastes a 240 L bin has contents having an average mass of 15 kg – being established by measurement at the Sutherland Hospital (TSH) for the development consent application lodged in 2015

(b) Estimate of mass of waste generated per week

Total clinical wastes reported for Calvary Private Hospital were 4.5 m3 per week on average (using the volume to mass conversion of 60 kg/m3 – the total wastes for a week's activity for Calvary

Private Hospital is 270 kg – scaling up for North Shore Health Hubs on the ratio of clinical beds provided by each facility (1.7:1), the weekly generated quantity of clinical waste for NSHH is 459 kg

(c) Proportion — The volume of wastes for each clinical waste stream for NSHH on a weekly basis has been pro-rated In accordance with the breakdown by mass as reported for TSH, the proportions being:

Sharps	20.4 %
Anatomical wastes	1.5 %
Cytotoxic wastes	1.0 %
Other Clinical wastes	77.1 %

APPENDIX B Schedule of drawings for Tower B, Stage 2 – NSHH, St Leonards reviewed in order to prepare this report

Drawing #	Issue/Rev	Title	Date
SK1		North Shore Health Hub	17/04/2018
DA-103A	A	North Shore Health Hub - Level 2A & 3B	17/04/2018
DA-103B	A	North Shore Health Hub – Level 4A & 5B	17/04/2018
DA-103C	A	North Shore Health Hub – Level 6B	17/04/2018
DA-103D	A	North Shore Health Hub – Level 7B	17/04/2018
DA-103E	A	North Shore Health Hub – Level 8B	17/04/2018
DA-105	D	North Shore Health Hub – Level 9 Plan	17/04/2018
DA-125	D	North Shore Health Hub – Shadow Diagrams	17/04/2018

APPENDIX C Who prepared this opinion?

This report was prepared by Ross Underwood, a graduate mechanical engineer with postgraduate qualifications in industrial engineering from the University of New South Wales, with over 49 years of experience in industrial practice in high hazard environments.

The first 12 years of his professional career were spent in the petrochemical industry where he was involved in a variety of different functions including engineering maintenance, major new plant construction, project work associated with energy conservation and improving environmental performance, and chemical plant production management. He then spent 3 years managing reconstruction works at the Pyrmont Sugar Refinery, before being appointed as Personnel and Administration Manager for a major manufacturing activity, a position he held for 5 years.

In 1986 he established Safety Engineering and Technical Services Pty Ltd, a safety consulting and engineering contracting/consulting business. His company has undertaken a substantial number of consulting tasks in safety management for a very diverse range of private sector industrial and government clients including what was then the NSW WorkCover Authority.

Ross has conducted specific training programs and seminar sessions in safety awareness, accident investigation & other safety skills at all organisational levels. He was formerly accredited by WorkCover NSW as a trainer in workplace consultation, building industry induction, hazardous substances and risk management courses. He has trained management & employee safety committee representatives from over 80 different organisations. He has lectured in OH&S for both undergraduate and postgraduate students at the universities of UNSW, Sydney, Western Sydney and the University of Technology. He has undertaken longer term engineering contracting/consulting assignments in the brewing, building and manufacturing/industrial, warehousing and transport, government and military sectors.

His particular areas of expertise include:- dangerous goods storage, handling and transport matters; laboratory design, classification of hazardous areas; occupational health and safety performance auditing; construction management; plant & machinery safety, maintenance; industrial relations; accident investigation; workplace and safety system auditing; product packaging and labelling; and, the formulation and maintenance of safe work systems (including the preparation of emergency response and environment management plans). He has also been involved in the pre-planning and design of a number of major manufacturing plant and warehouse projects and has prepared risk and hazard analyses as part of the process for securing development approval for these facilities.

He has provided a number of expert opinion reports for litigated matters related to oh&s and dangerous goods matters.
He has provided specialist advice on dangerous goods and more general occupational health and safety issues associated with several major building/re-building projects most recently including:- the Ingham Health Research Institute at Liverpool Hospital; the Hunter Medical Research Institute; the Australasian Institute for Innovative Materials at the University of Wollongong; a Veterinary Diagnostic laboratory at Charles Sturt University at Wagga Wagga; the Special Operations Working Accommodation Upgrade Project; the 171 Aviation Squadron (Blackhawk helicopter) Relocation Project; HMAS CRESWELL Redevelopment at Jervis Bay, the ASC Shipyard Redevelopment, and the upgrade of HMAS PENGUIN – all for the Australian Defence Forces; and, the major redevelopment of the University of New South Wales North Mall (including new facilities for Applied Science and Chemistry)

Ross has contributed as an author to a number of technical journals and to the CCH International *Occupational Health & Safety Manual*, the *Plant Safety* manual, the *OHS Manager- The Hands on Guide* and the *2003 Australian master OH&S & environment guide*.

He is a Member of the Institution of Engineers, Australia, a Member of the Safety Institute of Australia, a Chartered Member of the Australian Human Resources Institute, and a founding member of the Australasian Institute of Dangerous Goods Consultants.

He has completed Certificate IV courses in Workplace Safety, and Workplace Assessment and Training, the Risk & Liability Management short course convened by Engineering Education Australia, classification of hazardous areas course convened by Illawarra TAFE.