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Building Services Feasibility Report
Kareena Private Hospital Expansion
Akalan Projects Pty Ltd

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The report contains information provided to Connell Wagner by other parties. The report is provided strictly on the basis that the information that has been provided to Connell Wagner is accurate, complete and adequate.

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1. Introduction

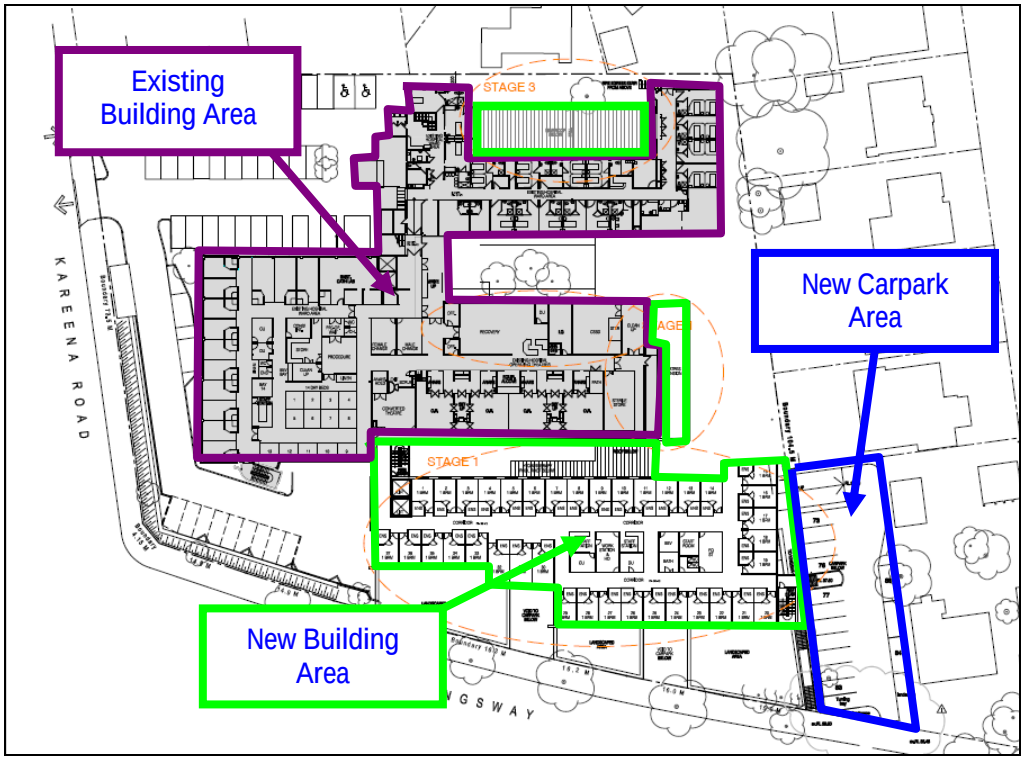
Connell Wagner has been commissioned by Aklan Projects to provide a feasibility study for the expansion works for Kareena Private Hospital.

The existing site is comprised of two levels dedicated for the hospital and an outdoor car park. The new site resides directly adjacent to the existing and consists of four levels; three of these levels are dedicated for the hospital with the lower ground floor as an underground car park.

This feasibility report outlines Connell Wagner's findings following a high level investigation of the existing building services, documented authority information, information provided by Kareena Private Hospital facilities management and architectural drawings from Akalan Projects for the proposed expansion.

We note that the existing building is less than 25m in height; drawings from the architect indicate that the new site will also be less than 25m in effective height.

1.1 Site



1.2 Gross Lettable Areas

Connell Wagner calculated approximate Gross Lettable Areas (GLA) from architectural drawings provided for the new and proposed expansion; detailed below:

Existing Site	GLA (m^2)
Lower Ground	3379
Ground	2962
Carpark (Open)	3780

Proposed Expansion	GLA (m^2)
Carpark (Underground)	1742
Ground	2008
Level 1	1445
Level 2	500

The existing site contains 6341m^2 of hospital and 3780m^2 of open carpark GLA (see report Introduction).

Assuming that GLA = NLA x 1.2 within buildings and GLA = NLA for carparks, we have:
- Existing Hospital NLA is 5284m^2
- Existing outdoor carpark NLA is 3780m^2
- Proposed extension underground carpark NLA is 1742m^2
- Proposed extension for Hospital NLA is 3294m^2

1.3 Sourced Information

Connell Wagner engaged a "Dial before you dig" application to the area comprising of the existing site and the new extension. Along with this application the sourced infrastructure information is detailed below:

1. Communications Cabling – Optus, Dial before you dig.
2. Communications Cabling – Telstra, Dial before you dig.
3. Sewer – Sydney Water, Dial before you dig.
4. Stormwater – Sydney Water, Dial before you dig.
5. Gas - Jemena Gas Networks (NSW) – Dial before you dig.
6. Electricity – Energy Australia South – Dial before you dig.
7. Electricity Bills – Energy Australia South – 12 months of Annual Bills for Kareena Private Hospital.
8. Electrical Demand - Energy Action – 12 moths of demand reports Kareena Private Hospital.
9. Electrical Infrastructure Advise
    a. Energy Australia South Planning
        i. Terry Lorry – 95855671
        ii. Lloyd Karrell – 9585 5644
        iii. Doug Chalker
10. EA NS 0112, Design Standards for Industrial/Commercial Developments, Energy Australia

2. Electrical Services

2.1 Maximum Demand

2.1.1 Existing Site

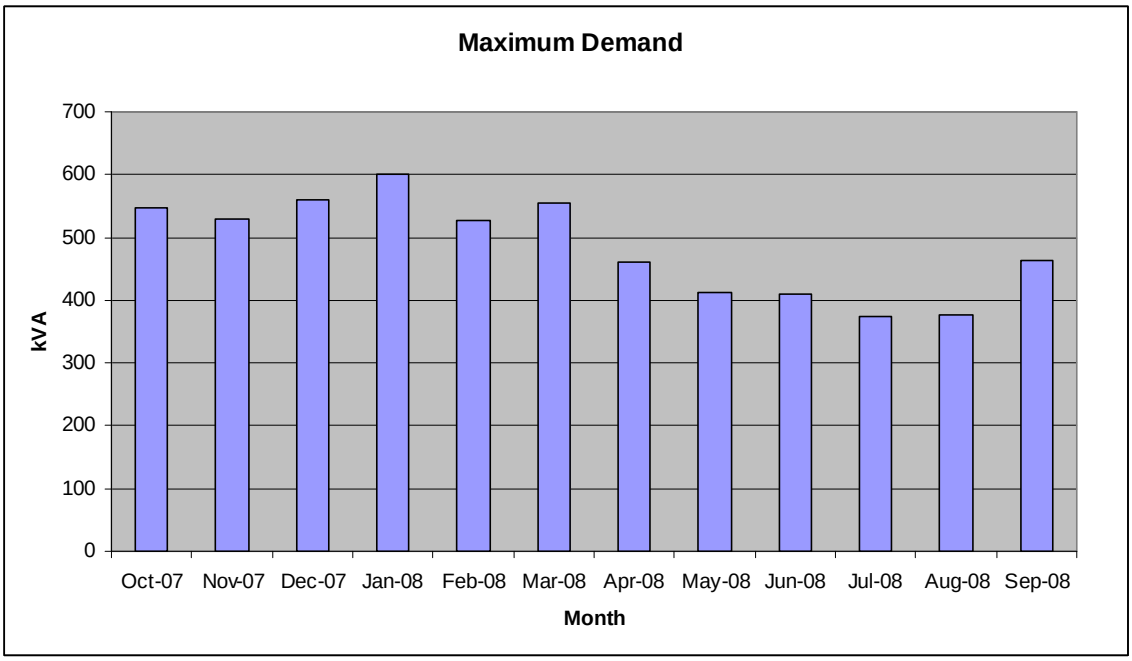


Figure 1: Results from Energy Action Reports for maximum monthly demand

The maximum recorded demand for Kareena Private Hospital is shown as 602kVA in January 2008. Energy Australia verifies this, as the maximum recorded demand was also shown in January to be 512kW which at a power factor of 0.85 equates to 602kVA. The maximum demand was recorded during the day which indicates that the outdoor carpark lights were not on.

Therefore, for an existing maximum demand of 602kVA and an existing NLA of 5284m^2 for the hospital, this estimates an electrical max demand loading of 114VA/m^2.

2.1.2 Proposed expansion

Connell Wagner's typical design loads for hospital developments is 125VA/m^2. The existing hospitals maximum demand loading is 114VA/m^2. These two maximum demand loadings are similar; taking a conservative approach 125VA/m^2 will be utilised for the maximum demand calculation for the proposed expansion.

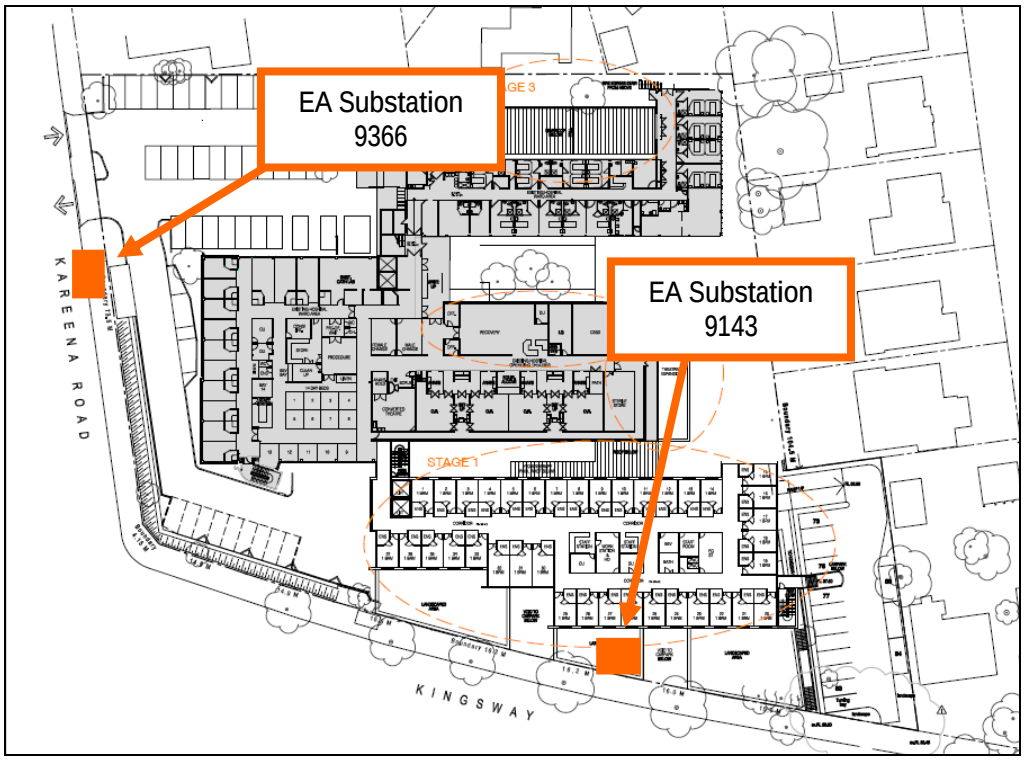
Energy Australia design loads for underground carparks is 15VA/m2 (EA NS0112).

The proposed expansions NLA of 3294m^2 of hospital and 1742m^2 of underground carpark, summates the calculated maximum demand to 438kVA.

2.2 Substation

2.2.1 Existing Site

There are two kiosk substations in the proximity of Kareena Private Hospital premises. One directly adjacent to the site boundary and another within the site boundary. Both substations are Energy Australia assets, with only one, which is within the site boundary (EA Substation 9143) and dedicated for Kareena Private Hospital, the other serving power to the street and surroundings.



EA substation 9143 is a 750kVA substation with 1000A outgoing supply. The existing maximum demand is 602kVA which indicates only 20% spare capacity is left on this substation for the site.

2.2.2 Proposed expansion

With the new expansion the maximum demand load is calculated at 438kVA, this indicates that the existing substation spare capacity is an insufficient source for the proposed extra power demand.

An alternative source of power is required; possibly a second transformer with a capacity of 500-600kVA. New substations or alternate sources of power will be an Energy Australia asset, and as such will require an application for connection submission.

2.3 Generator

2.3.1 Existing site

The existing generator on site is a packaged diesel generator (integral fuel tank). The nameplate ratings of the generator suggest that is rated at 200-300kVA.

This generator is being utilised as a source of backup power for essential services within the existing site. It will only operate and be used as a source of power when there is an electricity disruption/malfunction from the Energy Australia network or substation.

There was no indicator of whether the existing diesel generator is at capacity during backup power, as no recorded measurements were taken for such an occurrence.

From a design point of view, essential services (those requiring generator backup) are typically 40% of the maximum demand. This indicates that the existing 200-300kVA generator is at capacity for the existing site load of 602kVA.

2.3.2 Proposed Site

The sizing of the essential loads for the new proposed expansion will depend on the characterisation of these new loads. Without this load break-up information, no deductions can be made for the essential power required for the new proposed site.

By using the recent design assumption of 40% essential loading, would indicate that for a 438kVA primary load would require an additional 200kVA rated Generator for standby load for the proposed expansion.

2.4 Main Switchboard

2.4.1 Existing

The existing main switchboard incoming protection device is rated at 1000A, which coincides with the outgoing 1000A supply from EA Substation 9143.

The existing incoming protection device for the hospitals essential loads is rated at 250A, which coincides with the existing generator size.

Inspection of the main switchboard demonstrates it is at capacity with no sufficient spare space for any type of significant load additions or expansions.

2.4.2 Proposed expansion

It is suggested that a new main switchboard is required for the proposed expansion. This complements the requirements for an additional substation or alternative power source

3. Hydraulics Services

3.1 Sewer Drainage

Existing Service

The following Sydney Water owned sewer mains are located adjacent to and within the site;

- 150 dia sewer main located in within the north east part of the hospital site. This sewer reticulates east, then north and out through the northern site boundary. A section of this sewer is concrete encased.
- 150 dia sewer main located within the site along the eastern boundary reticulating north and out through the north eastern corner of the site boundary.
- 150 dia sewer main located in the south eastern corner of the site reticulation in an easterly direction

These authority sewers feature several inspection pits and sewer tie points within and adjacent to the site which would be suitable for connection.

Proposed Requirements

A fixture unit summary of the existing and proposed sanitary fixtures for the hospital site is as follows;

Area	Fixture Unit Count (approximate)
Existing Lower Ground	400
Existing Ground Floor	360
Proposed Lower Ground	50
Proposed Ground Floor	240
Proposed First Floor	240
Total	1290

The maximum loading of a 150 dia (private) sewer is 1310 fixture units. The approximate fixture count is marginally within this limit.

A section 73 application to Sydney Water will be required as a DA condition; the outcome of this application will indicate whether any of the sewer mains will require upgrade to 225 dia.

An alternative solution to avoid upsizing the Sydney Water sewer is to provide connections to two or all three sewer mains within the site, spreading the fixture unit load. This will require approval from Sydney Water.

Building over the existing sewer that reticulates through the site is not permitted. Attention to the location of easements must be considered during planning phase.

Proposed development plans indicate new building works are not located over any of these existing authority sewers. Some areas of new carpark will be located over existing sewer (along eastern boundary). This may require minor adjustments to the sewer, such as upgrading the loading class of manhole covers, however should not require major works.

3.2 Domestic and Fire Water

Existing Service

The following water mains are located adjacent to the site;

- 100 dia water main in Kareena Road
- 375 dia water main in northern side of Kingsway
- 500 dia Carrier main in southern side of Kingsway

The hospital site is provided with a metered domestic connection and a hydrant connection from the 100mm main in Kareena Road.

Proposed Requirements

The 100 dia authority main in Kingsway is sized adequately sized for the required domestic and fire fighting water demands of the proposed development; however it is likely that the domestic water supply main connection and meter assembly will need to be upsized for the additional demand.

3.3 Gas

Existing Service

The following gas mains are located adjacent to the site;

- 50mm Nylon 210 kPa gas main in Kareena Road
- 100mm 1050 kPa gas secondary trunk main in Kareena Road.

The hospital site is provided with a gas connection from the 210 kPa main, with meter and regulator located near the Kareena Road driveway.

Proposed Requirements

The gas main in Kareena Road appears to be suitable for connection for typical domestic gas demands of the proposed development; however it is likely that the gas connection and meter assembly will need to be upsized for the additional demand.

If plant or equipment is proposed for the development that requires large gas use, such as a gas powered cogeneration plant, the suitability of the gas supply will require further assessment.

EMERGENCY PROCEDURES MANUAL	Kareena Private Hospital 86 Kareena Road CARINGBAH NSW 2229 Phone 02 9717 0000 Fax 02 9525 1606	
Document Title	Document Number	No of pages
CODE ORANGE – Evacuation Assessment and Authority to Evacuate	EPM:008:001	1 of 1
Authorised by	Date Authorised	Revision Date
OHS Coordinator – Reviewed by Wormald	March 2008	March 2010

EVACUATION

CODE ORANGE

- Evacuation is the movement of patient/s and personnel from immediate or threatened danger, in as rapid and safe a manner as possible as directed by the existing emergency situation. Initially, it may entail horizontal evacuation of patients from a room or a department to a safe area with subsequent vertical evacuation, of a building or complex to a location that provides safety and shelter until the emergency is controlled.

- The situation should be assessed by the Emergency Coordinator, Fire Safety Officer, Emergency Services Officer, Senior Fire Brigade Officer before the decision is made to evacuate, having regard to -

  - Seriousness of the situation and the threat to human safety
  - Proximity of hazards
  - The nature and the type of patients in the area to be evacuated.

- First and second stage horizontal evacuation – ie. patients and staff from immediate harm is the sole responsibility of the person in charge of the department at the time, or Emergency Officer. Common sense in this instance must prevail.

- The decision to stage three evacuate is generally made by the Hospital Management, however the ultimate decision rests with the senior Fire/Police or Emergency Services Officer should they disagree with Management decision.

- Communication should be maintained at all times by Emergency Officer via the WIP, providing regular assessments of the situation at hand.

- Use Emergency Checklist to compile a list of patients and visitors to assist Emergency Services (EPM:008:001A).

Evacuation involves initially the horizontal movement of patients and staff with subsequent vertical movement as a last resort.

Movement should be efficient, rapid and as safe as possible following a rehearsed and pre-determined plan.

BOMB THREAT

Immediate and total evacuation would seem to be the most appropriate response to any bomb threat, however, there are significant economic and safety factors associated with a bomb threat that may weigh against an immediate evacuation. These are as follows:

- **Risk of Injury**
  As a general rule, the easiest area in which to plant an object is in car parks or in shrubbery surrounding the building or an area where the public has ease of access. Immediate evacuation through these areas may well increase the risk of injury. All egress should be searched prior to evacuation.

- **Response Impairment**
  Total and immediate evacuation may remove staff and other personnel from commencing a thorough search.

- **Panic**
  A sudden bomb threat evacuation may lead to panic and other unpredictable behaviour. This may lead to unnecessary risk of injury.

- **Patient Dependency**
  At least some of the patients in an area under bomb threat may be dependent on building services to survive.

- **Reduction in Patient care**
  Although the evacuation of patients to an assembly area may ensure their safety, repeated threats and evacuation would compromise patient care.

- **Total and immediate evacuation**
  Although risky, is the easy decision. The hard decision of when to return to the building still has to be made. The above factors may make immediate evacuation an undesirable option to a bomb threat.

- **Total Evacuation**
  Is the decision of the Hospital Management, however the ultimate decision would be made by the senior Police Officer in attendance if he/she disagreed with Management decision.

- **Partial Evacuation**
  One alternative to total evacuation is a partial evacuation. The response is particularly effective when the threat includes the specific or general location of the device or in those instances where a suspicious device has been located without prior warning.

  Partial evacuation can reduce the risk of injury by evacuating ambulant patients, visitors and non-essential personnel. Staff essential to search for a device can remain, critical services can be continued and in the cases of repeated threats, risk of injury is minimised.

FIRE

Unless fire and smoke infiltration gets completely out of control, it is seldom necessary to evacuate staff and patients past Stage 2. Both stage one and two at Kareena Private, may be conducted horizontally. To evacuate vertically would undoubtedly be due to failure of the integrity of the smoke doors, smoke infiltration or failure of the Fire Brigade to respond immediately to the alarm, for what ever reason.

PATIENT RECORDS

Saving records pertinent to patient care is important, however not crucial if it means putting life at risk or wasting valuable time removing patients to safe areas.

All effort to save an accurate bed statement should be made. The bed statement forms the basis of a head count following evacuation. During office hours Ward Clerks and Reception office staff are to print an up to date IBA Patient List.

COMMUNICATIONS

For as long as safe to do so and until a compartment has been searched for casualties and cleared, the Emergency Officer or designated person should stand by the WIP and maintain contact with the Emergency Coordinator.

The Emergency Coordinator should be notified via the WIP phone by Emergency Officers of all movements and the results of head counts, whenever staff or patients are moved to safer areas. The Emergency Coordinator will communicate this information to the Senior Fire/Police Officer.

EVACUATION EQUIPMENT

Rapid turnaround of wheel chairs, trolleys etc should be exercised. Patients should be removed from these devices once in a safe compartment.

Care should be taken not to leave equipment in hallways or egress. This careless and unthinking act could cause serious injury or loss of life to Fire Brigade Officers.

For the above reasons patients should not be evacuated in their beds, unless there is no practical alternative.

LIFTS

In the event of complete power failure, lifts will be powered by the emergency generator. Therefore, (in the event of level 3 evacuation) immobile or very ill patients ***only*** should be mustered in preparation for evacuation via the lifts.

Unless given permission by the Senior Officer of the Fire Brigade under no circumstance should Lifts be used during an evacuation.

EMERGENCY PROCEDURES MANUAL	Kareena Private Hospital 86 Kareena Road CARINGBAH NSW 2229 Phone 02 9717 0000 Fax 02 9525 1606	
Document Title	Document Number	No of pages
CODE ORANGE – Evacuation Assembly Points	EPM:008:003	1 of 1
Authorised by	Date Authorised	Revision Date
OHS Coordinator – Reviewed by Wormald	March 2008	March 2010

- Familiarity with the requirements of patient evacuation is a necessity in any hospital because of differences in structural design, a plan that suits one hospital may not suit another. Ideally, non-ambulant patients, whenever practical, should be located at lower building levels, thus minimising the extent of the evacuation problem.
- The presence of fire and/or smoke in an emergency situation may govern the choice of evacuation routes and prohibit the use of obvious exits, in which case the nearest accessible exit should be used.
- **EVACUATION ASSEMBLY POINT FOR ALL STAFF:**

CARPARK AREAS

(Or as determined by Emergency Coordinator and Fire Brigade)

EMERGENCY PROCEDURES MANUAL	Kareena Private Hospital 86 Kareena Road CARINGBAH NSW 2229 Phone 02 9717 0000 Fax 02 9525 1606	
Document Title	Document Number	No of pages
CODE ORANGE – Evacuation Stages, Priorities and Egress Routes	EPM:008:004	1 of 2
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OHS Coordinator – Reviewed by Wormald	March 2008	March 2010

- **STAGES**

Evacuation should be conducted in three (3) distinct stages, according to the severity of the situation.

Stage 1: Removal of people from the immediate danger area

Patients and other personnel in the immediate area will, in the first instance, need to be assembled outside the affected compartment. Once the area has been evacuated, doors should be closed to localise the fire and smoke.

Stage 2: Removal to a safe place

If the severity of the fire or smoke warrants further evacuation, patients should be moved through fire and/or smoke doors to safe areas. This may be to an adjoining compartment on the same level or to another level, preferably on a lower level.

Stage 3: Complete Evacuation of a building or compartment

Should the emergency necessitate evacuation of the entire building, the resources of all available staff will be required to assist in the movement of the patients to a place of safety.

- **ORDER**

For the purpose of evacuation it is desirable to sub-divide patients into three groups taking into account the type of patients accommodated:

Group 1: Ambulant

Ambulatory Patient who require direction only. If light is poor or there is smoke infiltration group should hold hands. Children under the age of 12 should at all times be accompanied by a parent/guardian or an adult staff member. Children should never be left to fend for themselves or entrusted into the care of a patient or visitor.

Group 2: Semi-Ambulant

Semi-ambulant patients requiring minimal assistance. Semi ambulant children and babies are to be included in group one.

Group 3: Non-Ambulant

Non Ambulatory Patients who have to be physically moved or carried. Patient should never be evacuated in their bed, unless this is a last resort due to physical size, or delicacy of the operation site. In this instance these patients should remain until all other patients are evacuated due to risks of blocking egress.

NB: Patients should never be evacuated in their bed, unless this is the last resort due to physical size, or medical condition. In this instance these patients should remain until all other patients are evacuated due to risk of blocking egress.

- **EVACUATION OF MOTHERS AND BABIES**

1. Mothers who have their baby with them in the ward areas would take, and be responsible for, their own babies.
2. Mothers already in the Nursery should take and be responsible for their own babies.
3. Nursing staff should not ring the wards for the mothers to come to the Nursery as this will create panic
4. It is imperative that mothers be reunited with their babies as soon as possible to prevent panie and the possibility of the mother returning to the scene.
5. The RN should remove the Day Book if possible, in order to assist with a head count in the evacuation area.

First Person

Issues instructions in a clear, calm, rational manner to all those available to assist.

Second Person

Removes babies to a safer compartment ie behind smoke doors, or courtyard.

Method of Removal

- Using an adult sized blanket (preferably wool) place babies in the Nursery on the blanket and drag to a safer zone.
- Mothers with twin babies must be assisted, or one baby evacuated by the nursing staff.

- **EGRESS ROUTES**

The location and severity of the situation will determine egress to be used.

The presence of fire and smoke (or both) in an emergency situation will govern the choice of evacuation routes and may prohibit the use of the closest exits.

The nearest most appropriate exit is always used.

For this purpose prior knowledge of the building layout by all staff is of paramount importance.

EMERGENCY PROCEDURES MANUAL	Kareena Private Hospital 86 Kareena Road CARINGBAH NSW 2229 Phone 02 9717 0000 Fax 02 9525 1606	
Document Title	Document Number	No of pages
CODE ORANGE – Isolation of Services	EPM:008:008	1 of 1
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OHS Coordinator – Reviewed by Wormald	March 2008	March 2010

ISOLATION OF SERVICES

ON SITE MAINTENANCE PERSONNEL 0401 984 413

Gas Isolation

- To isolate the gas supply to the hospital proceed to the entrance of the carpark on Kareena Road
- In the garden just inside the hospital grounds the main gas meter and regulator is located.
- At the base of the gas pipe directly under the regulator is the isolation lever.
- To turn this "off" simply push the lever down to the right when facing the lever.

Electricity Supply Isolation

- Within the Main Switch Room (located on the ground floor between the lifts and the Kingsway Wing entrance) is the main switch.
- It is marked "Main Switch" Sections 1, 2 and 4.
- To "**turn off"**
  - Grasp with both hands
  - Turn left using good pressure
  - It will engage into the "off" position with a deliberate sound.
- **Note: Section 3** of the main board is not isolated from the main switch.
- Each circuit breaker has to be switched off individually, **except Circuit Breaker No. 1** which controls the main fire board panel.

Oxygen, Medical Air, Nitrous Oxide

To isolate medical gases in case of fire, if instructed to do so:

- Shut off valves are located in the Medical Gas Cage
- On the right hand side on each gas manifold are two "Shut Off Valves", one is for normal supply and the other for emergency back up bottles.
- Make sure both are turned completely to the "**right**". You will see an arrow indicting "Close" and "Open" so you will be sure on the direction to shut off the medical gas.

Air Conditioning Isolation

The hospital's fire protection systems will **automatically** shut off the main air conditioning systems throughout the hospital. This will need to be restarted again by maintenance following each activation.