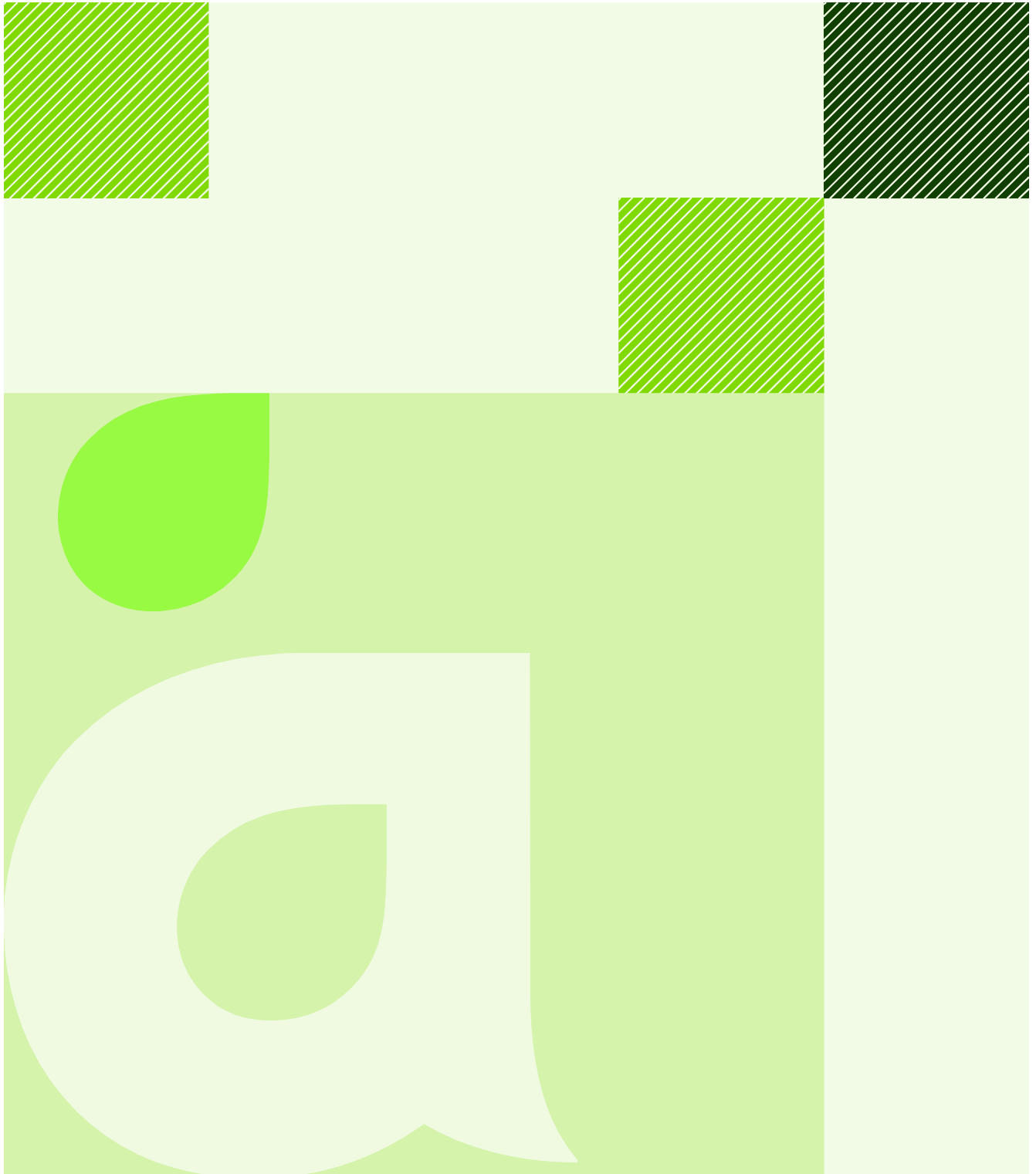


APPENDIX N

Fire and Hydraulic Services Report





Project: Kempsey District
Hospital

**Schematic Design Report – Fire and
Hydraulic Services**

Reference: 231582

Prepared for: Health
Infrastructure

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Kempsey District Hospital

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1 Executive Summary

1.1 Proposed Fire Services Design

A general overview of the proposed fire services works to be undertaken as part of Stage 1 of the KDH redevelopment project is as follows:

- New and existing buildings are to maintain sufficient fire separation between them for no BCA upgrade works to be necessary in those existing.
- The distance between openings in the existing ward and the new hospital street connection shall be in accordance with BCA Table C3.3 to negate the need for drenchers protecting the glazing along the proposed hospital street connection.
- Arup (the fire safety engineering team on this project) are to provide an Alternative Solution around the hydrotherapy pool to negate the need for drenchers between new building's main entry and the existing hydrotherapy pool and maternity ward. The new building shall be provided with sprinklers in lieu of a smoke zone control system in accordance with BCA requirements.
- The sprinkler and hydrant system will be separate systems so that the sprinkler system can be fed directly from the town main supply, and the hydrant system will have a reduced tank capacity of 150kL with 10L/s infill to ensure a 4hr supply is available (as per AS2419.1 – 2005 Cl. 4.2). This tank may be removed through fire safety engineering, but this is yet to be confirmed.
- The hydrant tank capacity (150kL plus infill), which is being installed in Stage 1 will be sufficient to serve the later Stage 2 & 3 works with no further infrastructure or upgrade works necessary to achieve this.
- New FIP and EWIS panels shall be installed in the main entry point to the new building off Polwood Street. The panels are to be scoped to have sufficient space within them for expansion of each system during Stage 2 and 3 of the project over the coming years to ensure minimal cost to NSW Health during these upgrades.
- Panels shall be interfaced with the existing panels in the ward's reception entry using either a high level interface card (EWIS), or by installing a Data Gathering Panel (DGP) adjacent to the existing panel to allow high level interfacing between the old conventional and new addressable panels.
- New external hydrant valves outside of the demolition zone shall be temporarily connected directly to the town mains supply as the building is constructed.
- Once the new fire ring main is in place on site, the external valves shall be fed from this in lieu. All temporary above-ground hydrant pipework can then be decommissioned and removed.
- Extinguishers shall be provided throughout site as per AS 2444 – 2001 and NSW Health requirements.

1.2 Proposed Hydraulic Services Design

A general overview of the proposed hydraulic services works to be undertaken as part of Stage 1 of the KDH redevelopment project is as follows:

- New site sanitary drainage shall be constructed in the early work package to facilitate all existing buildings during construction and service new building.
- Existing junction connection to council's sewer main to remain and be used as a main discharge point.
- New water connections to authority water main in Tozer Street to be established. This new supply will feed the 10kL emergency domestic water storage tank being utilised during Stage 1 works. The tank to be installed in the undercroft space of new building. Temporary water connection for existing Community Health Building shall be constructed in the early work package from this new supply line.
- A new 100mm diameter pressurised water ring main is to be constructed around new building with provision for future connections (exact location to be coordinated during detailed design phase). Adjacent to the water storage tank located in the undercroft space of new building, a pumping station and filtration plant shall be installed. Existing community building shall be fed from new ring main. Future provision for connections to the Mental Health and Maternity building shall be allowed for.
- Existing LPG storage to be relocated and supplemented with an additional tank to cater for the increased gas demand in accordance with AS/NZS (this will cater for Stage 1 works only). Supply agreement is to ensure LPG supplies are provided at a 9 day frequency between each to negate the need for a 3 week supply on site (TS-11 requirement). Access road to be constructed adjacent to services compound to allow access by LPG tankers for refilling.
- A new domestic hot water plant to be installed within the new building. Thermostatic mixing valves will be used for outlets where warm water is required;
- Within the refurbished areas, allowance shall be made for any necessary adjustments and diversions of existing hydraulic services to ensure the height, clearances and operation of hose reel and hydrant valves comply with code.
- New rainwater system shall be constructed for the new building's roof including downpipes. This shall be coordinated with the civil engineer on this project for connection to the site's stormwater system.

1.3 Environmental Impact Statement (EIS)

This project can be broken down into a number of delivery phases, all of which have different approval strategies under local town planning requirements. These phases are as follows:

Phase	Overview
Phase 1 – Construction Enabling Works	Building relocations
Phase 2 – Construction Enabling Works	Engineering services and associated works
Phase 3 – Construction Enabling Works	Demolition and site preparation
Main Construction Works	New Hospital Building Refurbishment Works (existing buildings)

The strategy proposed for fire and hydraulic services is to complete an early works design package during Phase 2 of the Construction Enabling Works. This will allow all water, LPG, hydrants, etc. to be relocated or rerouted outside of the construction zone prior to demolition works taking place. These works will be undertaken under the Review of Environmental Factors (REF) approval strategy.

The later phases (Phase 3 and the Main Construction Works), shall all be carried out under the site's Development Application (DA), as per the usual process.

With reference to the Director General's Environmental Assessment Requirements (application # SSD 5363), we can offer the following advice to each item which fire and hydraulic services design will directly affect (numbered as per application form):

Item #	Overview
1	Statutory and Strategic Context Not applicable
2	Built Form and Urban design New connections will be provided for underground sewer, external hydrant valves and LPG gas to the existing buildings during the early works scope.
3	Amenity The new building will result in a 15% increase in bed numbers. This increase in sewer discharge has been offset by the removal of the commercial laundry facilities on site, sterilisation services being outsourced from site, and there being no liquid trade waste increases following works, the impact of this increase would therefore be negligible on the existing sewer infrastructure.
4	Ecologically Sustainable Development (ESD) Aurecon reviewed the potential for rainwater harvesting but this option was not deemed feasible for these works. For fire services, potential water saving methods could be to use recirculating flow switches in the sprinkler system, to have all pump test water discharge back into the tank, and to ensure testing is carried out monthly rather than weekly by ensuring the correct indications are shown on the site's fire panel to warn of faults.
5	Noise and Vibration New pumps will be built on plinths in accordance with the relevant Australian Standards, and shall have vibration limiting fittings to reduce any impact their operation may have on the surrounding structure.

Item #	Overview
6	Transport and Accessibility A service road is being constructed off Tozer Street which will enable the LPG supplier to refill the new LPG tanks in the services compound to the east of the new building. The frequency of service deliveries are proposed to be every 9 days so that LPG storage capacity can be reduced (TBC by LHD over the coming months).
7	Flora and Fauna Not applicable
8	Bushfire Not applicable
9	Heritage Not applicable
10	Aboriginal heritage Not applicable
11	Sediment, Erosion and Dust Controls Not applicable
12	Utilities A 10kL domestic water tank will be installed in the undercroft area for emergency water supplies. The fire sprinkler system will be fed directly from town main (as will the domestic water under regular use), and the hydrant system shall have a 150kL storage tank in the undercroft area to ensure there is a 4hr supply using a 10L/s infill rate.
13	Contributions Not applicable
14	Flooding Not applicable
15	Drainage Water harvesting was not found to be cost-effective for this site following a review by Aurecon. There will be an on-site holding tank to contain any residual contaminants which come from the deluge shower which is being installed beside the ambulance entry. This waste will be disposed of by a waste management team to ensure it does not leach into the local environment.
16	Servicing and Waste Not applicable
17	Hazards Not applicable
18	Staging Not applicable

2 Project Description

2.1 Overview

Kempsey District Hospital is a 66 bed facility providing level 3 services including emergency, high dependency and coronary care, general medicine, general surgery, rehabilitation, maternity, mental health, renal dialysis, and a broad range of primary health care services.

The Hospital predominantly services the Kempsey Local Government Area (approximately 29,000 residents) and is located in West Kempsey, a short distance from the Kempsey Central Business District.

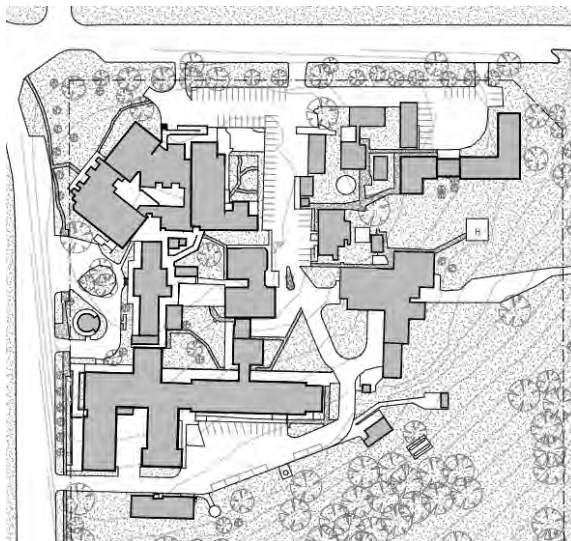


Figure 1 | Kempsey Hospital Site

Kempsey District Hospital is located within the Mid North Coast Local Health District, which also comprises facilities at Bellingen, Coffs Harbour, Dorrigo, Macksville, and Port Macquarie.



Figure 2 | Mid North Coast Local Health District

Kempsey District Hospital is part of the Hastings Macleay Clinical Network, which also includes Port Macquarie Base Hospital and Wauchope District Memorial Hospital.

2.2 Project Background

In 2011, the NSW Government submitted an application to the Health and Hospital Fund for the Kempsey District Hospital Redevelopment.

In May 2012, the NSW Government and the Australian Government announced a major capital investment of \$80 million for the Kempsey District Hospital Redevelopment Stage 1. The NSW Government will provide \$40 million and the Australian Government will provide \$40 million through the Health and Hospital Fund.

2.3 Project Overview

The Kempsey District Hospital Redevelopment represents a strategic capital investment in the health infrastructure of the Mid North Coast Local Health District and for rural services more generally across NSW. The broad objectives of the Redevelopment are to:

- Invest in increase clinical service capacity and address clinical service priority areas.
- Implement new models of care which better meet the health care needs of the community.
- Deliver culturally appropriate services which meet the needs of the high proportion of Aboriginal people in the Kempsey Local Government Area.
- Deliver new and contemporary health care facilities which support sustainable, safe, quality health care service delivery into the future.
- Support education and training of the health workforce, and workforce recruitment and retention strategies.
- Set up a strategic longer term development framework (master plan) for the site. This includes considering opportunities for future vertical expansion above the new hospital building.

2.4 Project Description

Service profile

The Kempsey District Hospital Redevelopment Stage 1 will provide increased service capacity and contemporary models of care to meet the changing and unique health care needs of the community. The Redevelopment will provide the following:

- New main entrance and front of house services.
- New emergency department (with 2 resuscitation bays, 10 adult acute bays, 2 fast track bays, 4 paediatric bays, and associated consultation rooms and support areas).
- New 6 bed emergency medical unit.
- Establishment of an integrated community care centre.
- New medical imaging department with CT, general x-ray, ultrasound and OPG.
- New 4 space medical day procedures unit.
- New 32 bed acute inpatient unit with an additional 8 shell beds.
- New 8 bed high dependency and coronary care unit.
- New operating theatre suite with two operating theatres, one shell operating theatre, Stage 1 recovery, and 9 space day surgery unit.
- Expansion of renal dialysis services from 5 to 10 chairs, and the establishment of a renal dialysis training unit.
- Expansion of oral health from 2 to 4 chairs.
- Relocation and or expansion of several primary health care, community, and ambulatory services.

In addition to this, the Stage 1 Redevelopment will also comprise:

- Connections between Stage 1 new facilities and the existing facilities to achieve good connectivity and operational efficiency across the site.
- External site works such as landscaping, pathways etc.
- Reconfiguration of car parking provision for patients, visitors, and staff.
- Engineering services reconfiguration / upgrade to meet the future needs of the hospital.



3 Process for Developing the Schematic Design Report

3.1 Alignment with Master Plan and Concept Plan Report Intent

As part of the concept and master planning phases of this project, the following processes were undertaken to ensure the integrity of the proposed options put forward by Aurecon:

- Complete a site analysis on existing services (referred to as due diligence by JSP) to review their existing compliance levels.
- Review how these existing services could be interfaced with the new building, or whether they can be left completely independent of the new works.
- Review the upcoming Stage 2 & 3 works which are scheduled to take place over the next 10 years and put forward any potential cost saving options which could be incorporated in Stage 1. This includes reducing the LPG storage on site using a more frequent supply agreement, verifying that the Stage 1 fire pumps and water supply are sufficient to supply the later stages without any infrastructure upgrade works, and ensuring any additions to the fire detection and alarm systems in the future can be easily incorporated through additions to the system being installed in Stage 1.
- Reviewing what Health Infrastructure's Expert Reference Group (ERG) wanted the project to consist of.
- Assessing what infrastructure is available to this plot of land from council services (such as the pressure and flow available from the local town mains supply, and the available sewer diagrams which can be utilised).

Having gone through these steps as noted, we were then able to assess which design options were the most viable for this project in terms of site safety, cost impact, and local services connectivity. With this data collated together, we then put forward our final master planning report which outlined the strategy being taken by Aurecon for fire and hydraulic services.

This report reiterates what these processes have defined in terms of the final design, while adding further information to it to suit recent discussions regarding the LPG supply, and the proposed safety shower holding tank which Council has requested.

3.2 Consultation with Health Infrastructure's Expert Reference Group (ERG)

As part of the design development process, we have received technical input from Health Infrastructure's Expert Reference Group (ERG) regarding key components which form part of the Master Planning process. The following are the proposed outcomes of these meetings to date:

- Sprinklers are the preferred method of achieving compliance throughout the new building, in lieu of zone smoke control systems.
- Following the receipt of the town main pressure and flow enquiry, it was found that separate sprinkler and hydrant systems were the most cost-effective option for the Stage 1 works. Although 20L/s was available from the town main supply, we could not verify that this would always be available therefore it was too high a risk to have the hydrant fed purely from the town main. Instead, a 150kL water tank will have a 10L/s infill from the town main to ensure 4hr water supply is always available to the attending Brigade service. Aurecon and Arup are currently investigating the possibility of conducting third party flow tests through the incumbent fire contractor, and using an Alternative Solution to justify these as being suitable for the design as an alternative to the 4hr tank supply on site.
- The existing detection and alarm system in the ward and heritage areas shall be reused and interfaced with the new building to save on upgrade costs given much of these areas will be demolished during later stages of works.
- LPG storage on site was originally scoped to comply with the TS-11 guidelines (a minimum of 3 week supply provided). During further discussions with HI, it was decided that an increased supply agreement would be made with the local supplier, which would result in the tanks being refilled every 9 days as was the case at the Port Macquarie site. LHD are to ensure this supply agreement is signed over the coming months as works take place.

3.3 Consultation with Authorities and Suppliers

Additional input has also been provided by a number of authorities and equipment suppliers over the course of this project to date. A brief overview of these can be found below.

3.3.1 Fire Services – Hydrant Systems

Following the receipt of a town main pressure and flow enquiry from Kempsey Shire Council (dated 1st November 2012), it was found that the maximum flow obtained could not be proven to be of sufficient capacity to supply the hydrant system directly from the town main. To counteract this discovery, we therefore had to revise our design from a 50kL sprinkler tank, to a 150kL hydrant tank with 10L/s infill from the town main (although there is the possibility of this being removed through an Alternative Solution if third party testing deems the supply sufficient).

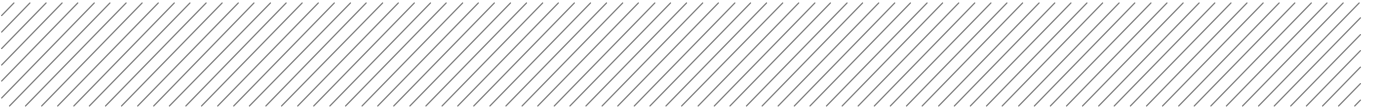
3.3.2 Fire Services – Sprinkler Systems

In light of the information above which was found when investigating the proposed design for the hydrant system, we can confirm that if the 150kL tank is required, then the sprinkler system could then be fed directly from the town main supply alone. If the Alternative Solution option is deemed feasible however, then the 50kL sprinkler tank would then be reinstated in the design.

In either case, the demand which both the sprinkler and hydrant system will put on the town main and on site water storage capacity is to be looked at holistically, as these two systems would no doubt be required to flow simultaneously in the event of a fire.

3.3.3 Fire Services – Dry Systems

We were advised on the 10th September 2012 by Firesense (suppliers of Notifier fire detection and alarm panels such as the ones already on site), that an interface panel could be installed adjacent to



the existing conventional panel to provide connectivity with the new addressable one. This offered a considerable cost saving so was put forward as the preferred option for this project.

3.3.4 Hydraulic Services – Sewer Connection

We have received drainage diagram from Kempsey Shire Council on 27th September 2012, but we are yet to receive formal approval stating they accept the small discharge increase from the site into the existing council sewer system. General consensus to our approach was not objected to during the meeting with Council on 24th January, and further discussions with their water services team since then confirms that this should not be an issue.

3.3.5 Hydraulic Services – Domestic Water Supply

We received a town main pressure and flow enquiry from Kempsey Shire Council (dated 1st November 2012), but we have not yet received formal approval of the proposed new connection to the existing water main in Tozer Street. General consensus to our approach was not objected to during the meeting with Council on 24th January, and further discussions with their water services team since then confirms that this should not be an issue.

3.3.6 Hydraulic Services – LPG

We were advised by Elgas (current gas supplier) that they are quite comfortable with being able to deliver LPG within a 9 day cycle to an essential service such as a hospital. We have to note that Elgas is not interested in and tries to avoid the installation of underground or mounded tanks for vapour supply. Apart from the initial huge capital cost required for this, there are additional maintenance and safety issues during the life of such installations.

3.3.7 Hydraulic Services – Deluge / Safety Showers

We were advised on 18th December 2012 by Craig Doyle from Kempsey Council that if we were to install a deluge shower beside the ambulance entry for washing down contaminated patients, that we would need to provide a holding tank to ensure this water does not reach the local sewer system. Subsequently, we have made a provision for such a system with emergency overflow.



4 Existing Services Overview

4.1 System Overview and Configuration

4.1.1 Fire Services

Fire detection and occupant warning is provided throughout the main ward and any buildings connected to it in accordance with AS1670.1. The detection system is controlled by a conventional Notifier AF-2600 Fire Indicator Panel (FIP), and the Emergency Warning and Intercom System (EWIS) by a Notifier I-2000 Main Emergency Control Panel (MECP) adjacent. Both of these appeared to be in good condition and fully operational at the time of our inspection. There are white Break Glass Alarms (BGAs) and Warden Intercom Point (WIP) phones located throughout each fire compartment to enable occupants to raise an alarm in the event of an emergency.

There are magnetic door locks on the fire and smoke doors throughout the ward and connected buildings. This is to maintain the integrity of the various compartments in the event of a fire via a release mechanism triggered from the FIP.

The hydrant system in the ward is supplied by a 100mm diameter town mains and booster assembly on River Street. Hydrant and hose reel coverage is provided throughout the ward building in accordance with Ordinance 70 requirements. Hydrant coverage is provided to the remainder of buildings on site via a number of external valves which are run straight from the town mains supply (independent of the boosted supply from River Street).

Maintenance records have been received from Chubb Fire for all services on site, verifying that they are having regular testing on them as per AS 1851 – 2005. It has been found that the hydrant system serving the ward building does not currently achieve the required pressure and flow to comply with the performance level the site was constructed. Aurecon have advised that this is an operational expenditure cost therefore should be excluded from the redevelopment works budget, but further discussions are currently taking place with site management to discuss how this will be addressed to ensure the refurbishment works in the ward comply upon completion.

Fire extinguishers are distributed throughout all buildings on site and have been maintained in accordance with AS 1851 – 2005 as required.

4.1.2 Hydraulic Services

The Kempsey District Hospital site is serviced with gravity sanitary drainage running from west to east, north to south and toward the south-east corner where it discharges through boundary trap to Kempsey Shire Council's sewer main located in the Tozer Street.



Water is supplied to the site from the authority main in the River Street via two 100mm diameter incoming services each with 50mm water meter including backflow preventers on each assembly. The town's water main is considered suitable to supply domestic water to the current site.

LPG gas is available to serve the site from two 7,500 litre each storage tanks located behind Mortuary building at the south-east corner of site. Currently LPG is supplied from existing fuel farm to gas fired boilers located on level 2 in the main building and to Mental Health building. LPG is also supplied to gas fired boilers located in Hydrotherapy building for pool water and space heating.

4.2 Key Risks

4.2.1 Fire Services

The main risk of water availability identified previously has now been mitigated following the receipt of the Kempsey Shire Council pressure and flow enquiry report. Previously we had stated that there may potentially be a 250kL fire water storage tank on site, but we have reduced this by using fire water storage for the hydrant system alone and providing an infill rate of 10L/s from the town main, then running the sprinkler system straight from the town main with a single diesel pump providing the required pressure levels.

Final definition of the above system shall be completed during the design development phases of the Stage 1 works as there are potential cost savings available using Fire Safety Engineering analyses. There is the possibility of conducting third party flow tests through the incumbent fire contractor, and using an Alternative Solution to justify these as being suitable for the design. This is an option which Aurecon are investigating at present.

4.2.2 Hydraulic Services

The sewer plan received from Kempsey Shire Council shows the KDH site discharge flows directly into a sewer manhole located at the intersection of Tozer and Tabrett Streets which leads into the 450mm diameter council sewer main. It appears that authority sewer system will be able to accommodate the 15% increase in sewage flows as a result of the Stage 1 KDH redevelopment works.

Given the existing commercial laundry building is being removed, sterilisation services are being outsourced from site, and there are no liquid trade waste increases as part of the Stage 1 works, the impact of this 15% increase on the existing Council sewer infrastructure is negligible. We are however still awaiting written approval of this matter from Council before we can verify this fact.

4.3 Key Strategic Issues

4.3.1 Fire Services

As the existing FIP is conventional, a Data Gathering Panel (DGP) will need to be installed adjacent to it if we are to continue running this system and interface it with the new building's FIP. A network card will be required inside the existing EWIS panel to provide connectivity between the new and existing panels.

The fire hydrant system on site is a mix of a Brigade boosted supply to internal valves in the ward building, and external valves running directly from the town mains supply serving the other buildings



across site. Given the Brigade cannot boost these external valves in the event of a fire, it is likely that that the available pressure and flow at these valves does not comply with AS 2419.1 – 2005 at present. The Chubb Fire flow test results for the ward building did not achieve compliance at the internal hydrant valves therefore further discussions will take place with Local Health District (LHD) and site representatives to rectify this issue prior to the redevelopment works taking place.

4.3.2 Hydraulic Services

There are a number of existing hydraulic services running across the construction zone. In order to clear the site for the new development, existing hydraulic services in the central corridor are required to be diverted and removed.

Our intention is to install sewer lines on both sides of the proposed Stage 1 new build running north to south which will serve new and existing buildings. This service will need to be installed in the early works package to enable all existing sanitary drainage from existing buildings to be connected before redundant services be disconnected and removed.

This option will allow ongoing flexibility in use and will be of great benefit in staging the works while the central construction corridor is demolished on site. It would also be designed to suit any future stages of works so that new connections can be tapped in where required without any further rerouting works.

Current LPG fuel farm will need to be relocated further away from existing mortuary building towards Tozer Street. Exact location will need to comply with AS/NZS 1596 for the storage and handling of LP Gas. Due to significant increase in demand for gas new LPG bulk storage cylinders will need to be added.

The LPG tanks will need to be accessible from the road once in place. A new service compound and service road is currently being constructed to the east of the site coming off Tozer Street. This will hold the LPG gas tanks, the HV electrical switchroom, and the medical gases supply compound.



5 Schematic Design Response

5.1 Overview and Objectives

Following discussions with HI and ERG, this section provides an overview of the options available on both the Stage 1 works, and future Stages 2 & 3. We have also recommended which option is chosen for the Schematic Design phase of these works due to their impact on both cost and safety to occupants of the building.

5.2 Proposed Options - Fire

- Whether sprinklers are the preferred method of achieving compliance throughout the redevelopment works (Stages 1 – 3), in lieu of zone smoke control systems (advantages of this option supplied in a brief report from Aurecon dated 4th September 2012 in Appendix 2 of this document);
- Whether a combined sprinkler and hydrant system or separate systems are the most cost and risk effective option. A combined system has cost saving implications, however separate systems are more suited to the town main water supply available, and provide an added level of system redundancy which is advantageous for life safety;
- Whether the existing FIP and EWIS be left in place to reduce costs, or whether the whole site be upgraded to run from the new panels now to create a fully addressable detection system throughout site.

5.3 Proposed Options – Hydraulics

- Whether the LPG storage on site must comply with the TS-11 guidelines (a minimum of 3 week supply must be provided), or whether this can be reduced to 10 days or less;
- Whether domestic hot water generation system shall be gas fired water heating plant with solar preheat plant or commercial heat pump system;
- Whether the cold water supply shall be mains fed system or use of emergency storage tanks to safeguard interruption be considered;
- Whether centralised circulating warm water system or thermostatic mixing valves shall be used;
- Whether roof rainwater storage, if required by the local authority, shall be used for irrigation and toilet flushing. Cost analysis has been issued as requested by HI. Aurecon recommendation is not to implement rainwater harvesting system.



5.4 Preferred Strategy – Fire

- As per the report supplied by Aurecon in early September (see Appendix 2 attached), we believe there are considerable advantages in utilising sprinkler protection in this building rather than zone smoke control. It is our recommendation therefore that sprinklers be provided as part of these works.
- Following the receipt of the town main pressure and flow enquiry, it has been found that the most cost effective and low risk option is to provide separate fire sprinkler and hydrant systems. The sprinkler system will be fed directly from the town main, and the hydrant system shall be fed from a fire water tank supply on site to ensure ongoing reliability of the water supply when the Brigade attend site.
- Our recommendation for the existing detection and alarm system in the ward and adjoining areas is that it be left in place and interfaced with the new panels via a Data Gathering Panel (DGP) adjacent to the FIP, and a network card within the EWIS panel. Initial calculations suggest that this would result in a cost saving of approximately \$150,000.

5.5 Preferred Strategy - Hydraulics

- The quantity of LPG storage tanks provided suits a 9 day supply agreement with the LPG supplier, as agreed with HI. While this does not meet TS-11 guidelines, Aurecon were instructed to reduce the initial 3 week supply (6x7500L tanks) to suit the design which had recently been completed at Port Macquarie site. To ensure LPG supplies can meet site requirements, LHD must sign a supply agreement confirming that the 9 day refill methodology is acceptable with the LPG supplier.
- Preferred option would be to use commercial heat pump system. Advantage of using heat pumps over gas fired heaters with solar preheat is that there will not be demand for LPG supply, the whole plant equipment may be installed on roof, estimated budget and running costs per annum are lower.
- Our preferred strategy for water supply is to use emergency water storage based on 3 hour interruption of supply fed from authority water main. Such system will increase supply failure resilience.
- Adoption of thermostatic mixing valves will be our preferred option. Disadvantage of using centralised warm water system is requirement for hot water system too for cleaning and sterilising. Capital costs and associated maintenance are higher.
- Adoption of rainwater harvesting system for this project is uneconomical and Aurecon preferred strategy is not to use such system.

5.6 Proposed Spatial Requirements

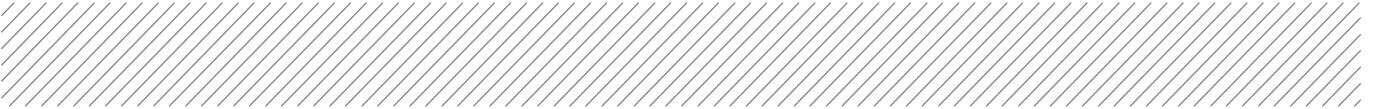
The table below identifies the spatial requirements necessary for the fire and hydraulic services which are recommended above. There is also an indicative Revit layout of the plant space in the undercroft area provided in Appendix 2 of this report.

Service	Notes	Future Works Integration
Fire Pump Room	Installation of three (3) fire pumps – one electric and one diesel for hydrant system, and one diesel one for the sprinkler system. These pumps will be sufficient to serve Stage 2 & 3 works with no upgrade works required. 4m(L) x 5m(W) <u>Usage of Space</u> Stage 1 100% Stage 2 0% Stage 3 0%	Installed during Stage 1 so no further upgrades required in Stage 2 or 3.
Fire Water Storage Tank	150 cubic metres of effective capacity storage space required in the undercroft area on the lower floor. Approx. 7m(L) x 7m(W) x 4m(H) <u>Usage of Space</u> Stage 1 100% Stage 2 0% Stage 3 0%	Installed during Stage 1 so no further upgrades required in Stage 2 or 3.
Fire detection and alarm systems	One FIP cabinet and one EWIS cabinet is to be installed during Stage 1 works. An additional cabinet will then be required for each system during Stage 2 1m(D) x 2m(W) x 2m(H) <u>Usage of Space</u> Stage 1 50% Stage 2 50% Stage 3 0%	Additional cabinets, cards and amplifiers to be installed in the lobby for both systems (FIP & EWIS) to serve later stages of works. This could be negated in the Stage 1 if need be, by installing all four cabinets up front for minimal cost.

Service	Notes	Future Works Integration
Sprinkler alarm valves	Exact spatial requirements to be determined during detailed design but worst case scenario has been allowed for here (1 alarm valve per floor): 1m(D) x 6m(W) <u>Usage of Space</u> Stage 1 60% Stage 2 20% Stage 3 20%	Additional valve rooms can be installed in each new building during the later stages of works to allow for sprinkler coverage throughout as each Stage is constructed.
Sewer and Sanitary Drainage • Sewer • Trade Waste	New sanitary drainage shall involve reconnection of existing buildings to new sanitary drainage and connection of new sanitary drainage to existing sewer junction. Emergency shower deluge system is required and will discharge to 5000l holding tank with emergency overflow and high level alarm.	A new 5000L in-ground grease arrestor shall likely be required during Stage 2 works.
Water systems Cold Water	Under-croft space required for hydraulic services (10,000L Emergency Storage Tank, triplex VSD Pumpset and Filtration plant) 6m(L) x 3m(W) x 4m(H) <u>Usage of Space</u> Stage 1 100% Stage 2 0% Stage 3 0%	10,000L emergency water storage tank only for Stage 1. Additional 10,000L water storage required for Stage 2 and beyond. Stage 2 & 3 cold water services will be located within these buildings once constructed.
Water systems Central Domestic Hot Water System	Roof (external) Heat pumps - 3m x 2.5m Storage cylinders - 10m x 2m x 2.5m(H) <u>Roof/outdoor space usage</u> Stage 1 100% Stage 2 0% Stage 3 0% <u>Level 3 space usage</u> Stage 1 100%	As with the cold water supply above, Stage 2 & 3 hot water services will be located within these buildings once constructed.

Service	Notes	Future Works Integration
	Stage 2 0% Stage 3 0%	
L.P.G system Storage with Concrete Hardstand	Concrete Hardstand Refer to matrix in Appendix	The concrete hardstand is proposed to be built to handle all stages, however for Stage 1 can be found in the matrix provided in the appendix.

Please note; the above spatial requirements are all subject to further review during later design development phases of the Stage 1 works.



Appendix 1

Sketches and Mark-ups

Sketches and Mark-ups

This section consists of the following information:

1. Fire detection system diagram showing new and old services across site
2. Proposed fire sprinkler and fire hydrant system infrastructures
3. Undercroft plant space showing fire and hydraulic services components
4. Hydraulic services demolition schematic
5. Proposed new sewer connections
6. Proposed new domestic water and LPG connections from Tozer Street
7. Safety shower contaminated water holding tank (sketch)



POLWOOD STREET

RIVER STREET

WARD BUILDING

OLD

OLD

QUI

OL

NEW

HP | MCT

NEW

NEW

II

NEW DEVICES

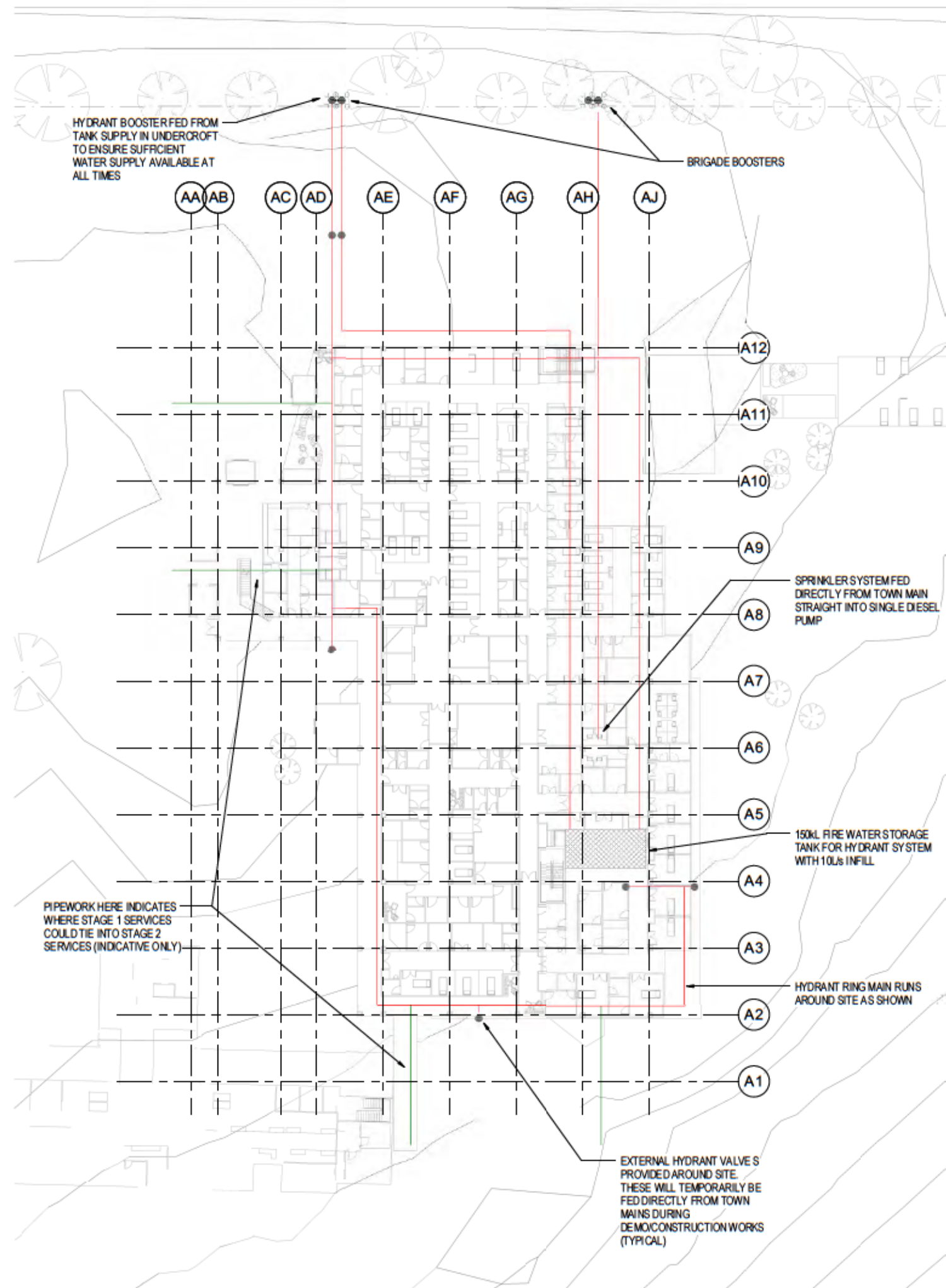
OLD DEVICES

aurecon
www.aurecongroup.com

REV	DATE	REVISION DETAILS	APPROVED
A			

KEMPSEY HOSPITAL REDEVELOPMENT

FIRE SERVICES FIP AND EWS PANEL SEGREGATION BETWEEN NEW AND OLD



CLIENT

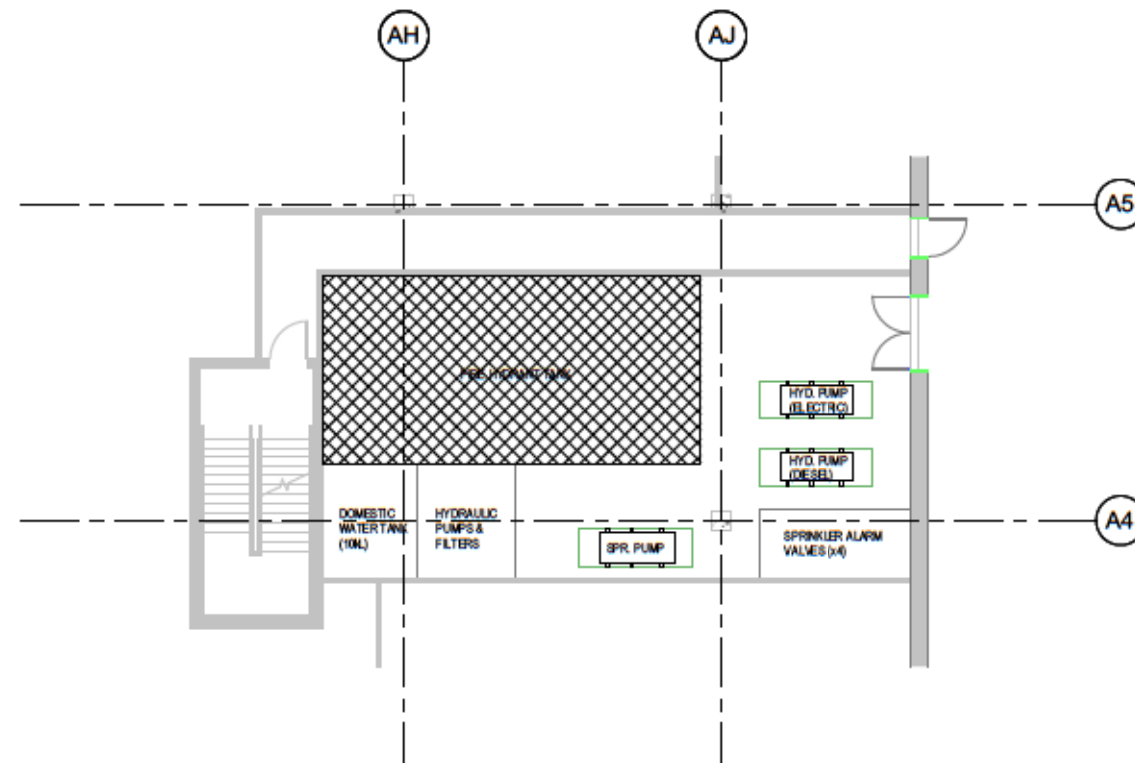
REV	DATE	REVISION DETAILS	APPROVED
A	Date 1	Revision 1	

PROJECT

KEMPSEY HOSPITAL REDEVELOPMENT

TITLE
FIRE PROTECTION SERVICES
FIRE SPRINKLER AND HYDRANT
SYSTEMS

DRAWN MRE	DESIGNED DK	PRELIMINARY NOT FOR CONSTRUCTION
CHECKED		PROJECT No.
APPROVED	DATE	SCALE NTS
Approver		DRAWING No. FI-201
		SIZE A1
		REV A



CLIENT

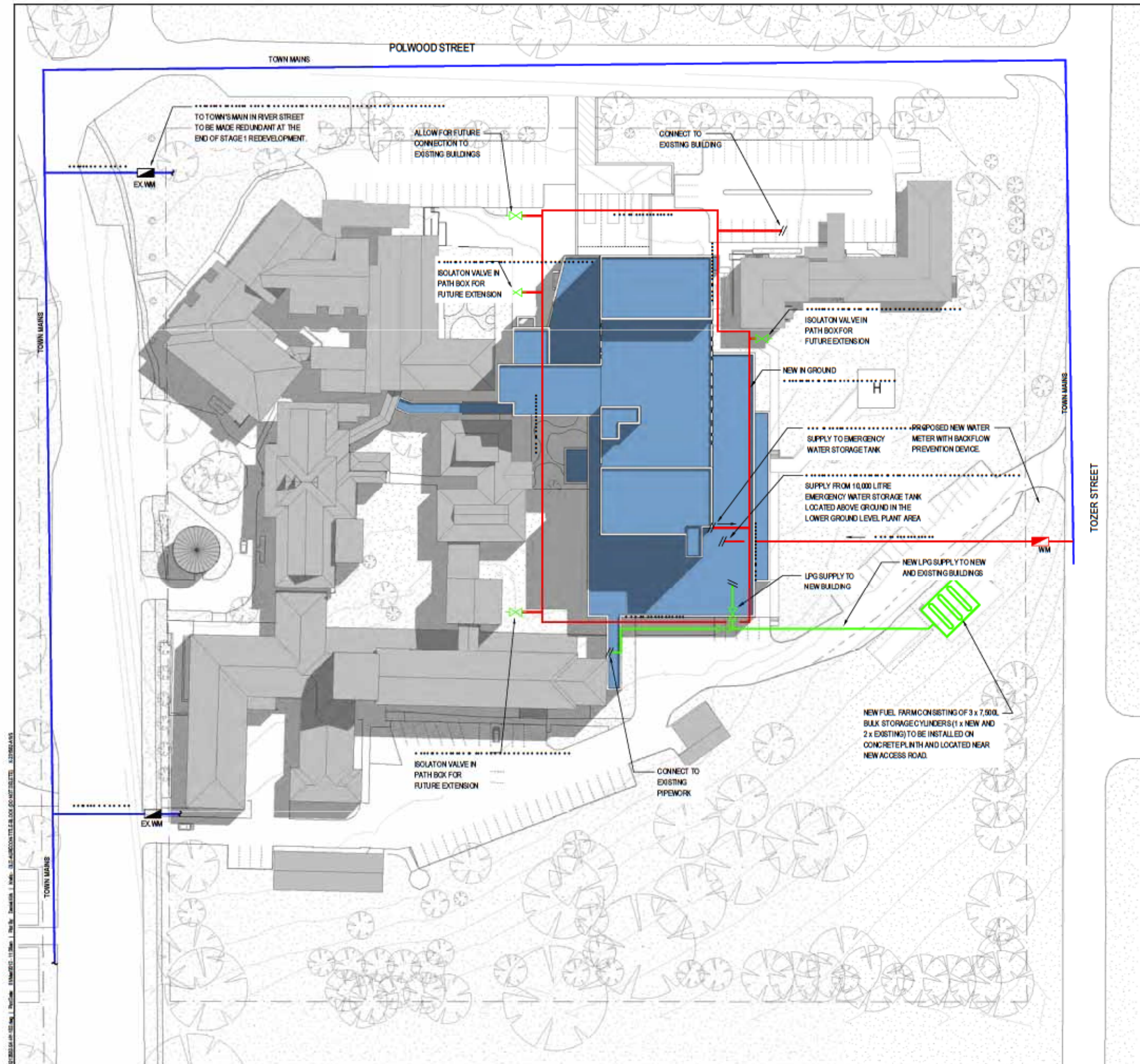
REV	DATE	REVISION DETAILS	APPROVED

PROJECT

KEMPSEY HOSPITAL REDEVELOPMENT

TITLE
FIRE SERVICES
LOWER GROUND PLANT

DRAWN MRE	DESIGNED DK	PRELIMINARY NOT FOR CONSTRUCTION	
CHECKED		PROJECT No.	
APPROVED		SCALE	SIZE
DATE		1:100	A1
		DRAWING No.	REV
		FI-202	



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CLIENT

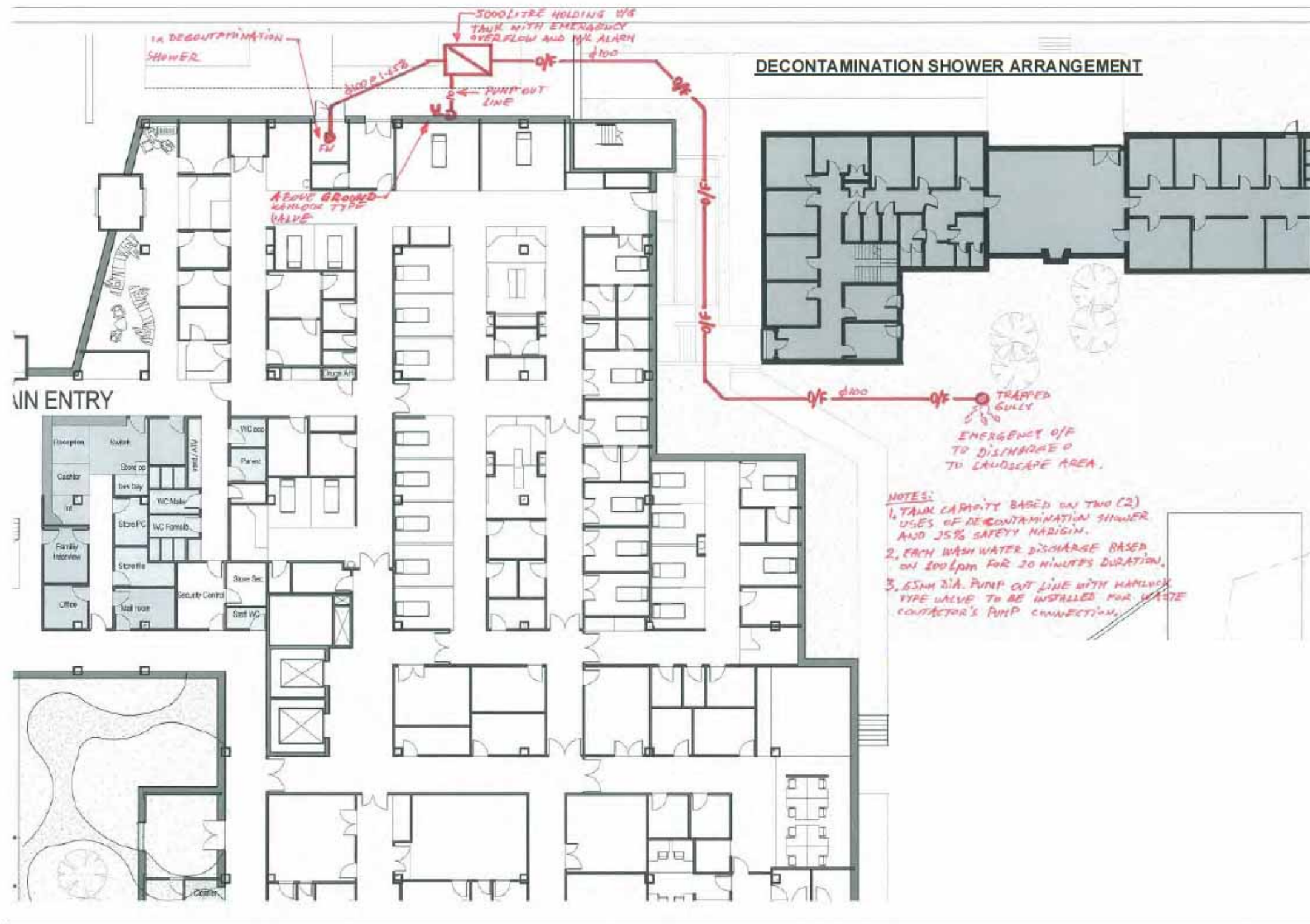
REV	DATE	REVISION DETAILS	APPROVED
C	31.01.13	REVISED CONCEPT SKETCH	
B	31.10.12	REVISED CONCEPT SKETCH	
A	28.09.12	CONCEPT SKETCH	

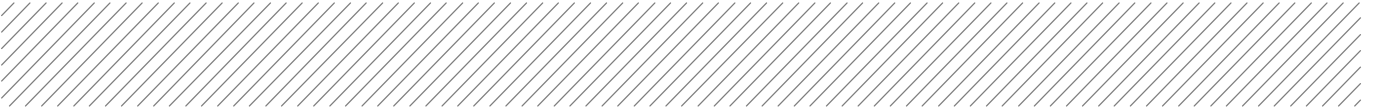
PROJECT

KEMPSEY HOSPITAL REDEVELOPMENT

TITLE
HYDRAULIC SERVICES
WATER AND LPG SERVICES
PREFERRED OPTION
STAGE 1

DRAWN TJG	DESIGNED TJG	PRELIMINARY NOT FOR CONSTRUCTION
CHECKED		PROJECT No. 231582
APPROVED	DATE	SCALE NTS
		DRAWING No. SK-HY-102
		SIZE A1
		REV C





Appendix 2

Reference Documentation

Available Documentation

This section consists of the following information:

1. Kempsey Council pressure and flow enquiry
2. LPG spatial matrix
3. Current AFSS certification
4. Aurecon's comparison of sprinklers vs. zone smoke control in hospital buildings



Ref: LA 18467
RAD:AEA

1 November 2012

Mr Daniel Kirk
Aurecon
PO Box 538
NEUTRAL BAY NSW 2089

Dear Sir,

**RE: WATER PERFORMANCE TEST – PT 125
KEMPSEY HOSPITAL, 119 RIVER STREET, WEST KEMPSEY**

I refer to your request for a water pressure test at the above site. Results are as follows:

<u>Flow at McCrometer flow meter</u>	<u>Residual Pressure</u>
L/S	kPA
0	300
5	300
10	295
15	290
20	280

Note: 20 litres per second was the maximum flow obtained from the flow meter.

The attached plan shows the hydrant locations used for these results.

Yours faithfully

M A Murphy
MANAGER WATER OPERATIONS

PRESSURE TEST PT 125

150 Dia
AC

RESIDUAL PRESSURE
READ @ HYDRANT
No-2460

150 Dia
AC

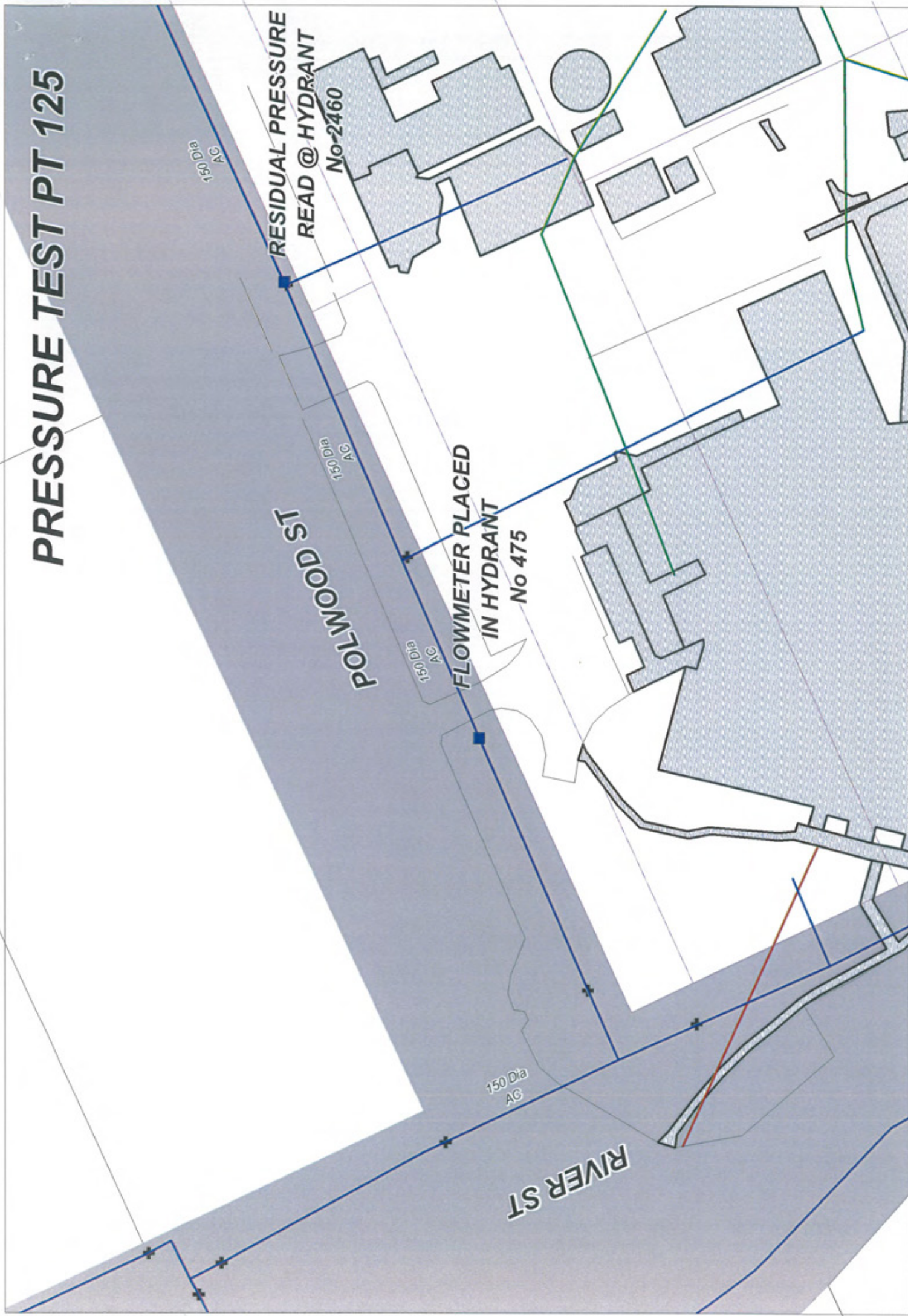
POLWOOD ST

150 Dia
AC

FLOWMETER PLACED
IN HYDRANT
No 475

150 Dia
AC

RIVER ST



Maximum Daily L.P.G Loads/Demand (winter months)				
	Litres/day of liquid LPG	Mj/day of LPG	Mj/hr (average)	Comments
Current	300	7,600	320	Two (2) x 7,500 litres LPG tanks currently serve hospital
Stage 1 (completed)	1,800	37,000 (mech.) + 1100 (hyd.) + 7,600 = 45,700	1900	1 x week LPG demand = 12,600 L 2 x weeks LPG demand = 25,200 L 3 x weeks LPG demand = 37,800 L 10 days LPG demand = 18,000 L
Stage 2 (completed)	3,200	35,000 (stage 2) + 45,700 = 80,700	3360	1 x week LPG demand = 22,400 L 2 x weeks LPG demand = 44,800 L 3 x weeks LPG demand = 67,200 L 10 days LPG demand = 32,000 L
Future Growth (Stage 3 - completed)	4,180	25,000 (stage 3) + 80,700 = 105,700	4,400	1 x week LPG demand = 29,400 L 2 x weeks LPG demand = 58,800 L 3 x weeks LPG demand = 88,200 L 10 days LPG demand = 42,000 L

Notes:

1. Existing LPG usage is extracted from Elgas deliveries data.
2. Proposed maximum daily LPG loads are based on loads provided by Umow Lai.

Estimated LPG storage and number of 7,500 L vessels				
	Based on 1 week maximum daily load	Based on 2 week maximum daily load	Based on 3 week maximum daily load	Based on 10 days maximum daily load
Stage 1 (completed)	3 x 7,500 L tanks	4 x 7,500 L tanks	6 x 7,500 L tanks	4 x 7,500 L tanks
Stage 2 (completed)	4 x 7,500 L tanks	7 x 7,500 L tanks	11 x 7,500 L tanks	5 x 7,500 L tanks
Stage 3 (completed)	6 x 7,500 L tanks	10 x 7,500 L tanks	14 x 7,500 L tanks	6 x 7,500 L tanks

Notes:

1. Maximum working storage/volume equals approx. 70% of total capacity of tank (maximum 85% filling ratio and minimum 15%).
2. To comply with TS11 guidelines required LPG storage shall be based on 3 week maximum daily load.
3. LHD can instruct design team to use different storage based on commercial agreement with gas supplier.
4. Number of tanks to meet the conditions of supply agreement would be determined by gas supplier.

Concrete hardstand for LPG tanks					
	Based on 1 week maximum daily load	Based on 2 week maximum daily load	Based on 3 week maximum daily load	Based on 10 days maximum daily load	Comments
Stage 1 (completed)	11.0 m X 9.5 m	11.0 m X 12.0 m	11.0 m X 17.0 m	11.0 m X 12.0 m	1. LPG tanks to be installed on minimum of 100mm thick reinforced concrete slab designed by the structural engineer to suit the ground conditions. 2. Maximum 6 tanks in one group (11m x 17m). 3. If more than one group of tanks than distance from one such group to another shall be not less than 10 meters.
Stage 2 (completed)	11.0 m X 12.0 m	11.0 m X 17.0 m and 11.0 m X 4.5 m	Two (2) hardstands 11.0 m X 17.0 m	11.0 m X 14.5 m	
Stage 3 (completed)	11.0 m X 17.0 m	Two (1) hardstands 11.0 m X 14.0 m	Three (2) hardstands Two 11.0 m X 17.0 m and One 11.0 m X 8.0 m	11.0 m X 17.0 m	

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL MAIN PATIENT CARE BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL MAIN PATIENT CARE BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Emergency Lighting	BCA E4.2 & E4.4, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Fire Hose Reels	BCA E1.4, AS 2441 or as originally required to achieve.	AS 1851.2-2005 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 AS 1221 or as originally required to achieve.	AS 1851.1-2005 or as originally required to achieve.
Fire Blankets	AS 3501 or as originally required to achieve.	AS 1851.1-2005 or as originally required to achieve.
Automatic door operation	BCA Part D or as originally required to achieve.	AS 1851-2005, BCA D2.19 or as originally required to achieve.
Fire Detection and Alarm System	BCA Spec E2.2a(2001), AS 1670.1 or as originally required to achieve.	AS 1851.8-2005 or as originally required to achieve.
Fire Alarm Monitoring System ("Code Red")	BCA Spec.E2.2a (2001) AS 1670.3-1997 or as originally required to achieve.	AS 1851.8-2005 or as originally required to achieve.
Emergency Evacuation Procedures	AS 4083	AS 1851-2005 or as originally required to achieve.
Fire Doors	BCA C2.12, C2.13, C3.4 to C3.8, D1.7 or as originally required to achieve.	BCA Spec C3.4, AS 1905.1 or as originally required to achieve.
Smoke Doors	BCA C3.4 clauses 2 & 3 BCA Spec C2.5 or as originally required to achieve.	BCA Spec C3.4, AS 1905.1 or as originally required to achieve
Automatic shut-down of air handling system	BCA E2.2a or as originally required to achieve.	AS/NZS 1668.1 or as originally required to achieve
Emergency Warning & Intercommunication System (EWIS)	BCA E4.9(d) 2001, AS 2220.1 & 2.	AS 1851-2005 or as originally required to achieve.
Fire and Smoke Dampers	BCA C3.15	AS 1851-2005 or as originally required to achieve.
Hydrant Systems	BCA E1.3 or as originally designed	AS 1851.4-2005 or as originally designed
Protection of Penetrations for service installations through fire resisting material.	BCA C3.15	AS 1851 BCA C3.15
Lightweight Construction	BCA C1.8	BCA Spec C1.8

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL BLOOD BANK & METHADONE CLINIC
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL BLOOD BANK & METHADONE CLINIC		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Smoke Alarm System Not required by BCA – Additional measure.	AS 3786	AS 3786.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL COMMUNITY HEALTH CARE BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL COMMUNITY HEALTH CARE BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Emergency Lighting	BCA E4.2 & E4.4, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Fire Hose Reels	BCA E1.4, AS 2441 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Fire Blankets	AS 2444, AS 3501 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Hydrant Systems	BCA E1.3 or as originally designed	AS 1851-2005 or as originally designed

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL DENTAL HEALTH CARE BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL DENTAL HEALTH CARE BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Emergency Lighting	BCA E4.2 & E4.4, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Fire Blankets	AS 2444, AS 3501 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL DRUG AND ALCOHOL BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL DRUG AND ALCOHOL BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Fire Blankets	AS 2444, AS 3501 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL COMPUTER TRAINING BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL COMPUTER TRAINING BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL CAMPUS – JACARANDA BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL CAMPUS – JACARANDA BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Fire Blankets	AS 2444, AS 3501 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Emergency Lighting	BCA E4.2 & E4.4, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL CAMPUS EDUCATIONAL CENTRE BUILDING
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL CAMPUS EDUCATIONAL CENTRE BUILDING		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Fire Blankets	AS 2444, AS 3501 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.

FIRE SAFETY SCHEDULE

Subject Property: KEMPSEY HOSPITAL CAMPUS BOILER ROOM
River Street
Kempsey

Property Owner: Mid North Coast Local Health Network

Development Consent No.: Unknown

The following is a list of existing fire safety measures visually noted as being associated with the building:

KEMPSEY HOSPITAL CAMPUS BOILER ROOM		
Fire Safety Measure	Minimum Standard of Performance (Design & Installation)	Minimum Standard of Performance (Maintenance)
Emergency Lighting	BCA E4.2 & E4.4, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Exit & Directional Signs	BCA E4.5, E4.6, E4.8, AS 2293.1 or as originally required to achieve.	AS 2293.2-1995 or as originally required to achieve.
Fire Hose Reels	BCA E1.4, AS 2441 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Portable Fire Extinguishers	BCA E1.6, AS 2444 or as originally required to achieve.	AS 1851-2005 or as originally required to achieve.
Hydrant Systems	BCA E1.3 or as originally designed	AS 1851-2005 or as originally designed
Fire Doors	BCA C2.12 or as originally required to achieve.	BCA Spec C3.4, AS 1905.1 or as originally required to achieve.

4th September 2012

Johnstaff
Level 8, 16 O'Connell Street
Sydney NSW 2000

Attention: Brody Atterby

Kempsey District Hospital – Sprinklers vs. Zone Smoke Control in Class 9a Buildings

1. Discussion item

Following the meeting undertaken at BVN's office on Monday 27th August 2012, a key issue which was identified for this project was whether automatic fire sprinklers or smoke hazard management systems be used to protect the new hospital building.

This choice stems from NCC 2012 Table E2.2a, in which it is stated that:

"A Class 9a health-care building or a Class 9c aged care building, or a building containing a part thereof, must be provided with....

- (c) in a building having a rise in storeys of more than 2 and not more than 25m effective height (not being a Class 9c aged care building) –
 - (i) a zone smoke control system in accordance with AS 1668.1; or
 - (ii) a sprinkler system complying with Specification E1.5 throughout with residential sprinkler heads in patient care areas."

Given that the proposed concept design building has a rise in storeys of >2, this has resulted in there being a trigger for one of these two systems to be installed within the new hospital building.

2. System comparison

The following tables identify the positive and negative points applicable to each system:

Automatic Sprinkler System

Positive

- Offers higher levels of life safety to occupants through control or extinguishment of a fire, and reduction of smoke production and temperature. This has significant benefit given the limited mobility of some patients;
- Sprinkler systems are noted as having a reliability of 95 - 99%* in risk analysis tables;
- Insurance discounts are sometimes available when sprinklers are installed.

Negative

- Sprinkler heads are less aesthetically pleasing;
- Sprinkler heads result in more ceiling coordination being required during the design process;
- May result in higher ongoing maintenance costs in comparison with zone smoke control (weekly as opposed to monthly). This can however be negated by installing the correct pump indications and backup batteries which we will be looking to do.

Zone Smoke Control

Positive

- Can extend tenable conditions by exhausting smoke from within the fire affected compartment;
- Can be relatively cost-effective in basic design situations;
- Ceiling coordination will be easier with this system in comparison with sprinklers;

Negative

- Given the fire compartment limitations for Class 9a buildings, installing a zone smoke control system around automatic closing fire doors will be difficult to design and potentially quite costly. This negates the cost effectiveness which usually comes with this type of system;
- A considerable quantity of smoke exhaust risers will be required to serve each compartment which could reduce the amount of usable area on each floor;
- AS 1668.1 zone smoke control systems are noted as having a reliability of 80 - 85%* in risk assessment analysis tables;
- Significant passive smoke compartmentation will already be provided therefore life safety benefit from adding this active system may be minimal.

* Source: NBFSSC, "Macroeconomic Reform: Fire Regulation", 1991

3. Recommended option

Given the considerably higher levels of life safety offered by an automatic sprinkler system, the potentially limited mobility of some patients, and the inevitable complexity of a zone smoke control system; Aurecon recommends a sprinkler system be chosen for Stage 1 of the Kempsey District Hospital Redevelopment works.

We also note that retroactive upgrades to a building due to a change in regulatory requirements can be a costly process. Installing sprinklers now would help give some level of confidence to HI that future changes in regulatory requirements (such as those implemented on nursing homes in recent months), would not result in any retrofitting works being required at a later date.

Yours sincerely,



Dan Kirk
Senior Fire Services Designer



Aurecon Australia Pty Ltd

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Philippines, Singapore, South Africa,
Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam.