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HEALTH INFRASTRUCTURE
NSW HEALTH

Byron Shire Central Hospital

Scheme Design Report

For

HYDRAULIC AND FIRE SERVICES

Project No : 7625

Revision : 4 - 100% Issue

Date : 6th August, 2014

REVISION SCHEDULE

NO	DATE	DESCRIPTION
1	17th July, 2014	95% Issue
2	25th July , 2014	95% Issue
3	31st July , 2014	100% SD Issue
4	6th August 2014	Revised 100% SD Issue (to suit client comments)

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1 EXECUTIVE SUMMARY

Cold Water Supply
The hospital will be supplied from the existing 150mm authority water main in Ewingsdale Road via a water meter and dual back flow prevention assembly located at the boundary adjacent to the main entry. The metered supply then fills the 100,000 litre storage tank and pressure pump assembly where the water supply serves the building at a constant pressure.

The pressure pump assembly serving the domestic cold water service will be fitted with a manual control valve to switch to mains pressure during any power outages.

On site water storage is required and has been sized to cater for a 24 hour authority watermain outage (as advised by the local authority) this is due to the authority infrastructure is incomplete and not deemed as reliable at this stage of the areas early development.

The domestic cold water storage tank is calculated based on the TS 11 requirements. The tank capacity is 100,000 litres.

Hot Water Services
The hospital is to be fed from a new centralized gas fired hot water system located within the mechanical services plantroom. The hot water will reticulate at high level through the building in a flow and return system providing hot water supply to all required fixtures. Temperatures will be controlled via localized thermostatic mixing valves generally proposed access will be from the corridors for minimal hospital disruption along with easy maintenance.

Sanitary Plumbing and Sewer Drainage
Sanitary plumbing and drainage will connect all sanitary fixtures and plant equipment to the new site network gravitating to the northeastern corner of the site via manholes and inspection openings in accordance with current requirements.

The majority of the hospital is single story built on ground, the hospital will be served by inground and aerial drainage to minimize venting.

The sewer drainage system will discharge to one of the following two options:-

1. Authority Sewer Connection- Further authority discussions are required to determine the location and date of the proposed capped junction which will be provided for the hospital site.
2. Onsite Sewer Pump out Station – This is the least preferred option due to ongoing running and maintenance costs for the site sewer discharge. The onsite sewer pump out station will be located in the northeastern corner of the site adjacent to the existing ambulance building in a separate building with requiring vehicular access. A sewer rising main will be required to extend from the pump station to the authority treatment plant approx. 4.32km away.

Gas Services
Liquefied Petroleum Gas is supplied to campus via a bulk storage tank on site adjacent to the existing ambulance building and reticulated throughout the site to the various plant and equipment.

The gas distribution pipework will be predominantly located external to the building with isolation valves provided at each building entry point for easy maintenance, capped off provisions will be located in the areas for future expansion.

Fire Hydrant System
The hospital will be protected by a new fire hydrant system including tanks and pumps in compliance with current standards. The building coverage will be provided by a combination of internal and external hydrants.
A fire hydrant booster valve assembly will be located adjacent to the main entry on Ewingsdale Road for Brigade use.

Fire Sprinkler System

The hospital will be protected by a new fire sprinkler system including tanks and pumps in compliance with current standards.

A fire sprinkler booster valve assembly will be located adjacent to the hydrant booster valve assembly near the main entry on Ewingsdale Road for Brigade use.

Dry Fire Services

The hospital will be protected by a new analogue addressable fire detection system which will initiate a sound system and intercom system, both in compliance with current standards.

2 GENERAL

The project is a new 65 bed hospital on a greenfield site at Ewingsdale adjacent to the existing ambulance building. The new Byron Shire Central Hospital (BSCH) will provide a consolidated hub of medical services, The provision of all current hospital services are to provide increased capacity for Mental Health, Allied Health, Imaging and Oral Health care from Mullumbimby.

The buildings are configured into 3 main fingers that are linked with a common enclosed passage way.

The hospital site is bounded by Ewingsdale Road & Parkway Drive.

This report covers the following services: -

- Sewer Drainage;
- Trade Waste Drainage;
- Cold Water;
- Hot Water;
- Liquefied Petroleum Gas;
- Fire Hydrants;
- Fire Hose Reels;
- Fire Sprinklers;
- Fire Detection system and Sound System and Intercom System for Emergency Purposes.

2.1 WATER MAINS

With reference to Byron Shire Council & Rous Water Mains Diagrams dated 16 July, 2014 (refer Appendix A), watermains are located as follows: -

- Ewingsdale Road – A 150mm deadend watermain is present on the south side of Ewingsdale Road which will provide water to the hospital. A separate connection exists for the ambulance building;
- Parkway Drive – A 100mm watermain is present on the north side of Parkway Drive within an existing residential area. This is not being considered to supply the hospital due to the current demand on the main.

2.2 WATER MAIN PRESSURE

A mains pressure enquiry was undertaken on the existing 150mm Ewingsdale Road main that will supply water to the hospital.

The results are as follows:-

150mm MAIN IN Ewingsdale Road (Near ambulance building)	
FLOW	**PRESSURE**
0 l/s	600 kPa
5 l/s	580 kPa
10 l/s	570 kPa

20 l/s	510 kPa
25 l/s	480 kPa
30 l/s	460 kPa
40 l/s	390 kPa
70 l/s Max Flow	120 kPa

The pressures and flow provide by Rous Water are not guaranteed as the current water main infrastructure is incomplete with the area still being developed.

2.3 WATER CONNECTIONS

The hospital campus will be fed from a single mains connection for the domestic cold water and fire services to serve hospitals requirements. The connection location is proposed to be adjacent the existing ambulance building at the end of the existing 150mm water main in Ewingsdale Road.
The water meter and backflow prevention assembly will be located adjacent to the main entry on the Ewingsdale Road boundary in accordance with current water authority requirements.

2.4 SEWER CONNECTIONS

At present there are no existing authority sewer mains in the area serving the hospital. Further discussions are required with Council to provide a suitable connection to the authority sewer.

The sewer drainage system will discharge to one of the following two options:-

Option 1 - **Authority Sewer Connection**- Further authority discussions are required to determine the location and date of the proposed capped junction which will be provided for the hospital site.
Option 2 – **Onsite Sewer Pump Out Station** – This is the least preferred option due to ongoing running and maintenance costs for the site sewer discharge. The sewer pump station will be located in the northeastern corner of the site adjacent to the existing ambulance building in a separate building with requiring vehicular access.

2.5 ONSITE SEWER PUMP OUT STATION

There is a proposed onsite sewer pump out station option being considered should the authority be unable to provide a gravity sewer system to for the hospital to discharge to.

The onsite sewer pump out station will be located in a building adjacent to the existing ambulance building at the north eastern corner of the site being the low point of the campus. The onsite sewer pump out station plant will be located above the RL15.00 being the flood level of the existing water course.

The proposed onsite sewer pump out will require vehicular access for servicing and maintenance purposes.

2.6 GAS CONNECTIONS

There are no authority natural gas mains available in the vicinity of the hospital site. It is proposed that the site will be supplied with a 4.5kl Liquefied Petroleum Gas (LPG) bulk storage tank on site serve the hospital's requirements. The gas will be reticulated within an inground reticulation system to convey gas to the required plant and appliance throughout the site.

2.7 WET FIRE SERVICE SUPPLY

The fire hydrant and fire sprinkler water supply will be fed from a bulk water site storage tank sized in accordance with the relevant standards.The tank is fed from the incoming water supply that is connected to the existing water main in Ewingsdale Road.

The fire hydrant and fire sprinkler system will be a standalone system not connected to the existing authority 150 mm water main in Ewingsdale Road.

2.8 DRY FIRE SERVICE CONNECTIONS

The main fire indicator panel will incorporate alarm signaling equipment (ASE) connected to an approved monitoring station which, in turn will notify Fire and Rescue NSW (FRNSW) of a fire condition.

3 EXISTING SITE SERVICES

The hospital is to be constructed on a Greenfield site. Therefore there are no existing hydraulic or fire services presently directly servicing the site.

The existing ambulance building located in the lowest corner of the site does have an existing small water connection to the existing water main in Ewingsdale Road and discharges the sewer drainage to a small septic type system.

4 PROPOSED SERVICES

4.1 GENERAL

This section of the report outlines the hydraulic and fire services proposals for new hospital campus. These will allow for 20% future expansion to take place on the campus.

4.2 COLD WATER SERVICES

Water Supply Connection
A new 100mm water connection will be made to the existing 150mm authority watermain in Ewingsdale Road adjacent to the existing ambulance building. This will supply water to the hydraulic and fire services for the new hospital campus and will allow for future expansion.
The hospital will be supplied from the existing 150mm authority water main in Ewingsdale Road via a water meter and dual back flow prevention assembly located at the boundary adjacent to the main entry. The metered supply then fills the 100,000 litre storage tank and pressure pump assembly where the water supply serves the building at a constant pressure.

Water Meter
A new water meter assembly and backflow prevention device is proposed to be provided at the site boundary on the incoming mains connection on on the Ewingsdale Road adjacent to the main site entry.

Domestic Cold Water Storage
The water supply in the area is considered to be unreliable due to the incomplete infrastructure within the area, however as the hospital is a Regional Base Hospital. The reliability of water supply is critical and therefore water storage is proposed.Water storage will be provided in accordance with the requirements of Engineering Services and Sustainable Development Guidelines - Technical Series TS11.The guidelines stipulates a figure of 1,000 litres of storage per bed, per day as a general guide.

The new hospital campus will have up to 65 beds with the future expansion provision of up to 100 beds including the potential future Perioperative building. Therefore a 100,000L water storage tank will be provided based on a 100 bed hospital as a standalone system to serve the hospital's requirements.

The hospital will draw off the tank supply permanently which will be continuously topped up by the mains pressure supply.

The pressure pump assembly serving the domestic cold water service will be fitted with a manual control valve to switch to mains pressure during any power outages

Domestic Cold Water Pumpset
The domestic cold water supply to the hospital campus will be pressurised from the storage tank and service all of the areas of the new hospital. The pressure pump assembly will be a triplex variable speed drive system designed to cater for the flow and pressure demand.

Water Supply
The water supply will reticulate from the storage tank and pressure pump assembly and serve the hospital campus's fixtures and equipment via an inground ring main with capped isolation valve provisions for future connection to cater for future expansion. Backflow prevention devices will be provided to service areas with cross connection hazards such as dirty utility areas and the like.

Isolation valves will be provided at each building entry and fixture group for control and isolation of each area independently.

4.3 HOT WATER SERVICES

Hot Water Plant
A new centralised, gas fired, hot water plant will be provided to supply the new hospital. A modular Rheem system is proposed in order to provide good redundancy and ease of replacement. The plant will be located on the lower level adjacent to the Mechanical Boiler Plant.

A flue system will be provided in order to discharge flue gases away from mechanical air intakes.

Hot Water Reticulation
Hot water will be circulated throughout the hospital at 60°C to 65°C via a dual hot water circulating pumpset. Hot water will extend from the hot water plant to a main flow and return system and branch off at each wet area.
Isolation valves will be provided at each fixture group for control and isolation of each area independently.
Backflow prevention devices will be provided to service areas with cross connection hazards such as dirty utility areas and the like.

Warm Water
Warm water will be provided via the use of Thermostatic Mixing Valves located to service all fixture groups. Isolation valves will be located adjacent to the thermostatic mixing valves to allow easy maintenance to each wet area.

4.4 SANITARY PLUMBING AND SEWER DRAINAGE

Sanitary Plumbing
Minimal sanitary plumbing stackwork will be required on this project as the majority of the building a single level on ground structure with a small portion of the hospital being 2 storey's adjacent to the main entry.

Sanitary plumbing will be connected to stackwork and vented preferably via piped vents, with air admittance valves being utilised where piped venting cannot be achieved.

Sewer Drainage
A network of main sewer drainage lines will be provided external to each finger of the hospital to serve all of the wet area requirements. The sewer drainage system will gravitate to the low point of the site via manholes and inspection openings for easy maintenance.
The majority of the inground drainage system will be located external to the building to ensure minimal hospital disruption should a blockage occur.

Sewer Connection
Sewer drainage system will connect to either an authority capped junction provided adjacent to the low point of the site in Ewingsdale Road or an internal onsite sewer pump out station located adjacent to the existing ambulance building located at the low point of the site.
Further Council discussions are required to confirm the location and timing of the authority sewer infrastructure.

Soft Landscape Irrigation
The Soft landscape will be irrigated an underground drip feed system or localized slimline rainwater storage tanks should an authority sewer connection be available where an onsite sewer pump out station is no longer required.

Trade Waste Drainage
Trade waste provision will be made for the kitchen area and café to protect the sewer drainage system in accordance with the local authority requirements. An inground grease trap will be provided adjacent to each food preparation area/café.

4.5 DOWNPIPES

General Description
Downpipes will extend from roof gutters / outlets down to the inground drainage system (inground drainage documented by the Civil Engineer).Roof rain water will be used for the local building soft landscape via individual slimline tanks fitted with hose taps adjacent to each building.

4.6 GAS SERVICES

Gas Supply
A new LPG bulk storage tank will be provided on site adjacent to the existing ambulance building which will provide gas to the required plant and equipment. A systems 3 Gas Safety Shutdown device which will protect the hospital.

Gas Services
The gas supply will be utilized primarily for hot water generation for both hydraulic and mechanical services. Gas will be reticulated throughout the site to serve all required appliances via an inground network of pipes with isolation valves at each building entry point. Capped off provisions will be provided to cater for future expansion. The gas service will conform to the requirements outlined within the Planning for Bush Fire Protection act 2006 prepared by the RFS as nominated in the Bush Fire Report.

4.7 FIRE HYDRANT AND HOSEREEL SERVICES

Fire Hydrant System
A new standalone fire hydrant system will be provided to protect the hospital via an external ring main system consisting of both external and internal fire hydrants. The hydrants will provide building coverage in accordance with AS2419.1-2005

A fire hydrant booster valve assembly will be provided adjacent to the main entry on Ewingsdale Road for the brigade to operate during a fire emergency. Pump suction points will be provided at the booster valve assembly from the onsite storage tank.

Fire Hydrant Water Supply
A new 368,000 litre combined fire sprinkler/fire hydrant storage tank will serve the fire hydrant system via a dual pump assembly in accordance with current requirements.

The system will incorporate a tank type booster assembly to enable Fire and Rescue NSW (FRNSW) to draw water from the tank or the street main.

Fire Hydrant Pumpset
Fire hydrant supply from the storage tank will be pressurised via a diesel pump assembly located adjacent to the storage tank. The pumps will be located within a weather proof building in accordance with current requirements..

Fire Hosereel System
Fire hose reels will be supplied from the domestic cold water system via backflow prevention devices where a cross connection hazard exists. The system will be pressurised via the domestic cold water pump assembly.

Fire hose reels will be located within 4metres of exits within each fire and smoke compartment of the building providing coverage in accordance with AS 2441

4.8 DRY FIRE SERVICES

General Description
An analogue addressable fire detection system which will initiate a sound system and intercom system for emergency purposes (SSISEP) will be provided throughout the hospital. The main fire indicator panel (MFIP) and master emergency control panel (MECP) will be located in the designated hospital main entry.

Mimic panels will be required at strategic locations E.g. Staff bases.

The MFIP will monitor sprinkler and hydrant systems, provide interface to associated services for the required shutdown of non-essential equipment and provide trip facilities to the likes of the security system to fail safe electric locking devices at designated fire exits on a fire condition.

4.9 FIRE SPRINKLER SERVICES

General Description
While a sprinkler system for this building is not currently required by the National Construction Code (BCA 2013), in accordance with Health Infrastructure guidance note 2, the building will be provided with a sprinkler system that is compliant with AS2118.1-1999. The sprinkler system is proposed to be installed throughout the entire building.

Fire Sprinkler Connection
The system will incorporate a booster assembly to enable Fire and Rescue NSW (FRNSW) to draw water from the tank. This will be located adjacent to the fire hydrant booster assembly.

Fire Sprinkler Water Tank
It is proposed to install a new 85,000 litre (estimated) fire sprinkler storage tank (combined with a 288,000 litre hydrant water storage tank). The tank will be located adjacent to the Ambulance building at the lower end of the site.

Fire Sprinkler Pumpset
Fire sprinkler supply from the storage tank will be pressurised via a diesel and electric pumpset located adjacent to the tank. The pumps are proposed to be located in a weather proof enclosure

Fire Sprinkler Alarm Valve Assemblies
The fire sprinkler alarm control assemblies will be located at adjacent to the pumps. Monitored isolation valves will be provided for each wing of the building.

Fire Sprinkler System
The fire sprinkler system will extend from the alarm valves throughout the ceiling space of the buildings. Ceiling and void space sprinklers will be provided throughout.

5 ENABLING WORKS – PROPOSED SERVICES

5.1 GENERAL

Enabling Works

Cold Water

Cold water is available at the existing ambulance building water connection to serve the construction facilities.

Sewer Drainage

Consideration should be given to the Completion of the onsite sewer pump out station prior to the completion of the construction works should an authority sewer not be available in the required time frame.

6 APPENDIX A – ROUS WATER AUTHORITY WATER MAINS DIAGRAM

7 APPENDIX B – HYDRAULIC AND FIRE SERVICES SCHEME DESIGN SITE PLAN