Roxy Theatre
Existing Conditions Review

ENGINEERING SERVICES

Feasibility Report

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1.0 TABLE OF CONTENTS

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2.0 BUILDING FABRIC

2.1 Existing

The building fabric, from a thermal/energy/acoustic point of view would be considered poor. The following is a summary of the existing building fabric including some of the major concerns:

- Roof insulation is located at the ceiling level and not the at the roof. This means that the roof space will heat up and transfer heat into the spaces below. Refer Figure 1
- The roof insulation would most likely not comply with current requirements of the Building Code of Australia (BCA).
- The walls generally have good thermal inertia and would most likely meet current building code requirements.
- The openings for natural ventilation, see figure 2 below, do not comply with the current BCA. They are thermally weak and also allow significant noise into the auditorium.
- The building has significant leaks allowing uncontrolled unconditioned air into the building.

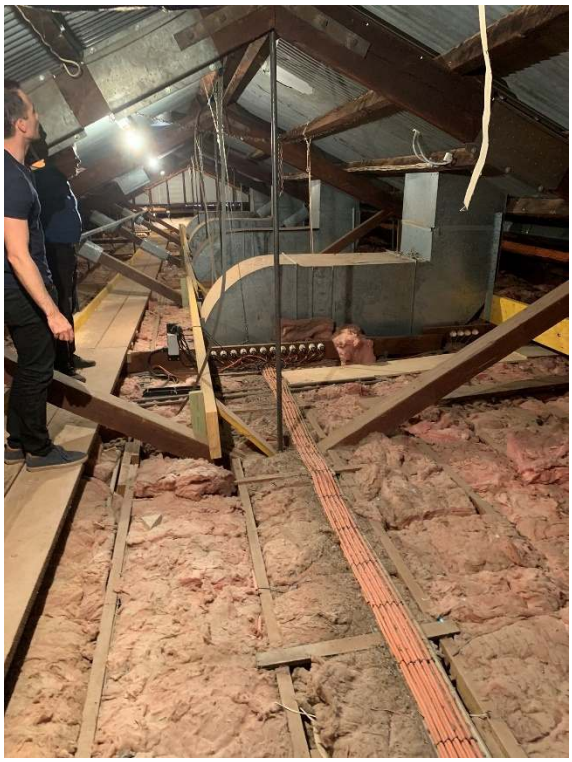

Figure 1

Figure 2

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2.2 Options

Where possible and funds allow, BRT recommend that following:

- Increase insulation in the roof by installing insulation at the roof level. This will provide the thermal performance as well as increasing the acoustic performance, lowering rain noise in ingress of external street noise.
- Seal up building where possible. This usually involves multiple tubes of sealant.
- Replace metal ventilation windows with new thermal acoustic treatment. The upgrade of the windows will need to meet the thermal requirements of the BCA and the acoustic and light performance for the auditorium.

3.0 MECHANICAL SERVICES

3.1 Existing Mechanical Services

3.1.1 Ventilation

The existing building appears to have mixed mode ventilation throughout the building. The main auditorium is ventilated via the roof mounted evaporative cooling systems that pump fresh air into the auditorium.

We believe that the air is relieved from the space using either open doors or the metal windows at high level. The relief path has an impact on both light control and acoustic disturbance within the space.

Some toilets have small exhaust fans, however generally, the rest of the building is naturally ventilated using either openable windows or fixed grilles to ventilate the respective space.

3.1.2 Heating

The existing building is heated by a reticulated hydronic heating system via a gas boiler located in a plant room at the rear of the auditorium. The heat is reticulated to wall mounted hydronic panels scattered within the space. Refer figure 3.

When the building is in heating mode, there does not appear to be any mechanical natural ventilation of the auditorium. As long as the functions do not carry on for too long this may or may not be an issue.

The office has a small reverse cycle air-conditioning unit that can provide heat as required.

The boiler serving the building is relatively new and in good condition. It is suitable for re-use.

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Figure 3

3.1.3 Cooling

Cooling to the auditorium is achieved using four evaporative coolers, located on the roof ducted directly into the space. For these units to function properly, the air introduced into the space needs to be relieved. At the moment this process has an adverse effect on the light and acoustic requirement of the space.

Figure 4

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The office also has a reverse cycle air-conditioning. Otherwise there is no other cooling within the building.

3.2 Proposed Heating and Air Conditioning System Discussion

The level of new mechanical equipment provided may be limited by the funds available to upgrade the systems within the building.

Theatre spaces are notoriously difficult to heat and cool. Heating is particularly difficult due to the high ceilings and large volumes. If the building is not well sealed, heat will generally rise. This makes it difficult to keep heat at the floor level, whilst the upper seating areas can get too hot.

Due to the weather conditions in Leeton we understand that the heating is not required all that often. This reduces the need to heat the space at a high level. We would anticipate that as long as the cool edge is taken off the space, the heat generated from the occupants and internal heat load of lights and equipment will keep the space warm enough without adding too much heat.

The cooling load in a building of this nature is generally larger that most buildings. This is due to the high occupancy, and therefore large quantity of fresh air requirements, and high internal heat loads.

The most appropriate form of cooling is refrigerative cooling either in the form of chilled water reticulated to fan coil units or packaged fan coil units.

Either way, new plant space is required to accommodate a mechanical plant area.

The advice from the structural engineer indicates that the roof over the auditorium cannot handle any more load. In addition, the building is built over the entirety of the land the building sits on. The only place for additional plant would be at the rear of the building in the SW corner.

If full air-conditioning were provided, BRT estimate that this would cost in the order of $300K plus building costs.

Although not ideal, at this stage BRT recommend that the evaporative cooling be retained and upgraded to include some acoustic attenuation and mechanical relief.

Unless additional funds become available, BRT recommend that the existing heating and cooling within the auditorium remain as the same, with slight modification to control the removal of the air introduced into the space.

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The pros and cons for evaporative cooling versus refrigerative cooling include:

System	Pros	Cons
Evaporative Cooling	• System already existing • Low running costs • Low maintenance	• Noisy • Increases humidity in the space and therefore decrease comfort levels • Does not work on humid days. This should not happen that often in Leeton • Low temperature control due to system process • Low temperature control within the space
Refrigerative Cooling	• Provides cooling to 22 deg • Improves comfort • Low noise • More control of temperature within space	• Higher running costs and maintenance costs • High Capital cost

3.3 Proposed Mechanical Upgrade

The following is a summary of the items included in our cost estimate budget for the mechanical upgrade of the Roxy Theatre.

3.3.1 Proposed Zoning & Mechanical Services Scope of Works

Table below summarizes scope of demolition works and proposed mechanical services to new and existing areas.

Zone	Existing	Proposed	Comments
Auditorium	Hydronic heating and evap cooling.	System to essentially remain the same, add mechanical relief to the space and upgrade acoustically where required.	Add to new digital control system to control heating and cooling.
Roxy Theatre	Hydronic Heating	New AC	Stand Alone Split system
Theatre Bar	Wall mounted AC in office	New AC	Stand Alone Split system
Kitchen	Nil	New Ventilation and heating to meet code	Cooling not allowed for at this stage
Foyer	Hydronic Heating	Existing to remain	
New Change Rooms	Nil	New AC and ventilation	Reverse Cycle AC heating and cooling.
Control Room/Projector Room	Wall mounted AC	Relocate existing units.	
Amenities	Some Exhaust and natural ventilation	New exhaust to all amenities	

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3.3.2 Controls

It is proposed that the mechanical services upgrade include a Direct Digital Control system (DDC). This will enable remote monitoring of the system from any PC set up with the software as well as a number of enhanced client functions. Some of the features of a DDC system include:

- Central computerized control for fan coils & central plant.
- Ongoing data recording for energy management-Accessed via webserver.
- Optimization of indoor conditions via air quality monitoring.
- Mechanical control of ventilation systems interfacing with operable windows.
- Global control of temperatures, local controllers can be adjusted only within parameters set by global control.
- 'Out-of-hours' usage protocols can be developed.

The other main benefit is that it can be linked with the lighting control and/or security systems which means that the following functions can be employed:

- Local units can be deactivated when lighting motion sensors inactive.
- Global off post activation of security system.

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4.0 ELECTRICAL SERVICES

4.1 Existing Conditions

4.1.1 Incoming Electricity Supply

The incoming authority supply to the site comes from a pole located at the rear of the property in the south west corner. Refer Figure 5. The aerial cables connect to the building and run to a main switchboard in the basement of the building.

The meters are set up into two meters. Theatre and Shop. The shop appears to be the office at the front of building. Refer figure 6

Each meter has an 100A isolator. This means that the total supply to the building is 200A.

200A supply should be enough to run the facility without full air-conditioning. We would recommend that the supply be modified to consolidate the two meters into one supply of 200A.

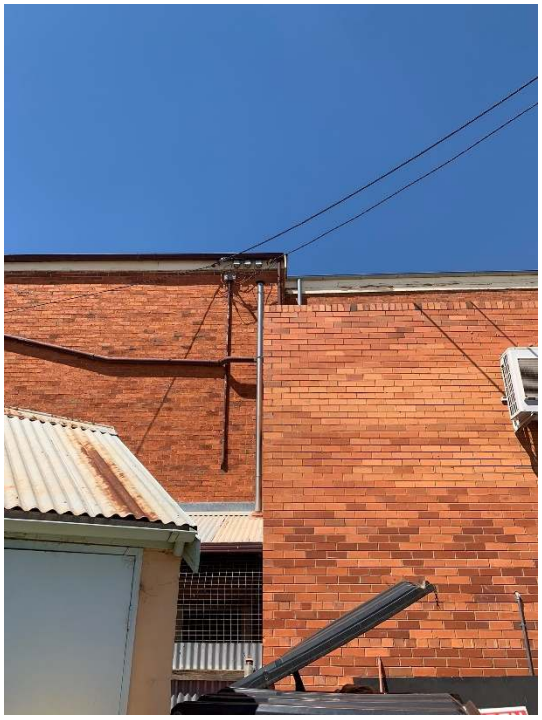

Figure 5

Figure 6

Should 200A not be sufficient for the immediate upgrade the power supply may need to be upgraded. This will require a Level 3 designer to negotiate with the power authority. Until this time, costs for the upgrade are unknown.

4.1.2 Main switchboard

The Main switchboard, refer figure 6 needs to be updated to suit new metering requirements. It also does not comply with current regulations.

BRT suggest that the new board be set up to allow for future complete upgrade of the building, including full air-conditioning.

4.1.3 Existing Distribution Boards

The existing boards do not comply with current regulations and will therefore need to be upgraded.

4.1.4 Existing Lighting

The existing lighting does not meet current regulations and standards including:

- BCA in relation to energy efficiency.
- Australian Standards in relation to lighting level.
- Normal operation to theatre requirements.

In addition, the theatre does not have a blue light system for the theatre operation.

4.1.5 Existing Emergency and Exit lighting

The existing emergency and exit light systems do not comply with current standards and will need to be upgraded. The existing batteries will need to be removed.

4.1.6 Existing Power Reticulation

As there needs to be changes to the power reticulation for the proposed works, any electrician will need to certify the existing system as well the new works.

It will be unlikely that any electrician will certify the existing reticulation and therefore allowances have been included to cover the rewiring of existing power, not that there is a lot.

The new cabling as part of the recent theatre works upgrade will be able to be retained.

4.1.7 Existing Backup Generator

There is an existing backup generator in the basement of the facility. We understand that the system has not been run for a while. The generator is not required by any standard or code and therefore is ‘technically’ not required. Therefore, the generator will be removed.

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4.2 Proposed Works

The electrical services proposed for this project will be designed in accordance with the Building Code of Australia (NCC/BCA), relevant Australian Standard and local authority requirements.

All systems shall be designed to reduce energy consumption and minimise waste.

4.2.1 Proposed Electrical Services Works by area

Table below summarizes scope of proposed electrical services to new and existing areas.

Area	Proposed	Comments
Auditorium	New -Power, data, theatre tech, WIFI access, lighting, addio power	
Stage	New -Power, data, theatre tech, WIFI access, lighting, audio power	Exsiting dimming wiring where possible to be re-used
Roxy Theatre	New -Power, data, theatre tech, WIFI access, lighting	
Theatre Bar	New -Power, data, theatre tech, WIFI access, lighting	
Kitchen	New -Power, data, theatre tech, WIFI access, lighting, audio power	
Foyer	New -Power, data, theatre tech, WIFI access, lighting	
New Change Rooms	New -Power, data, theatre tech, WIFI access, lighting	
Control Room/Projector Room	New -Power, data, theatre tech, WIFI access, lighting	
General	New emergency and exit lighting	

4.2.2 Switchboards

All existing switchboards will be replaced with new boards to meet the requirements of the BCA including earth leakage and metering.

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4.3 Lighting

4.3.1 General Lighting

Generally existing lighting will be made redundant and removed. New fittings will be LED throughout all areas and selected to compliment the functional and aesthetic requirements of each space. This shall include dimmable lights and controls.

The existing external feature lighting will remain.

4.3.2 Lighting Control

Lighting control to the hall is proposed via a Dynalite control system. This will provide the flexibility and functionality to enable halls users to select a number of pre-programmed dimming settings and typical lighting 'Scenes'. This will also allow for 'master off' from central control panel or via input from security system.

Motion sensors will be provided to amenities and service areas to control lighting.

4.3.3 Emergency and Exit Lighting

New emergency and exit lighting will be designed in accordance with BCA and AS2293 requirements.

4.4 Communications Data/Voice Cabling

4.4.1 Existing Communications Rack & MDF

The current communications rack and Telstra MDF is located in the office adjacent the of main foyer. There are a small number of data points wired back to this current location.

Relocation of these items shouldn't be a significant issue and will be further explored during design process.

The new communications will need to be set up to include connection to the NBN when it becomes available.

4.4.2 Proposed

All new data/voice outlets will be wired back to a new rack in the new office. All theatre tech data outlets to be wired in accordance with theatre tech design.

All cabling is proposed to be wired in CAT 6a and will be tested and certified on completion. It is assumed that all switching hardware required shall be supplied, installed and commissioned by the client.

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4.4.3 Wireless communications

Good practice will include wireless access is required throughout all areas. Ceiling mount data points for connection of Wireless access points (WAP) will be provided. WAP points to be provided by client when funds permit.

4.5 Security System

There doesn't appear to an existing security system, client to confirm.

Generally, we would propose to install a passive infrared detection system to all spaces. Arming stations would be provided at entrances where required.
Tecom, Inner Range or similar.

4.5.1 Door access control System

Client to confirm door access control requirements.

4.5.2 CCTV

The extent and type of the CCTV system installation to be confirmed by client.

4.6 Fire Detection System

Currently there is no fire detection within the building. It is assumed this building would be classified as a class 9b public assembly building, which under current standards would require a fire detection system if it is considered to have a rise in levels of more than 2.

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5.0 HYDRAULIC SERVICES

All Hot and cold water and sewer reticulation shall be in accordance with AS3500.

5.1 Domestic Hot Water System

Existing hot water systems appear to consist of local electrical storage units. Condition of these units will be assessed and replaced as required.

Mixing valves will be installed to all showers and basin areas to provide low temperature hot water (50°C) in accordance with relevant standards.

5.2 Cold Water Reticulation

Cold water reticulation will be provided to fixtures as required.

5.3 Sewer

The sewer connection for the building is at the rear of the building in the SE corner of the property. The existing sewer will essentially remain and be modified to suit the new layouts. Redundant pipes should be removed.

The proposed extension to ground floor amenities is generally in the same location as existing and shouldn't present an issue. This will be reviewed, if and when as built sewer drawings can be obtained.

5.3.1 Kitchen Grease traps

There are currently no grease traps on the property. Evaluation of the equipment proposed for the kitchen will need to be undertaken and a grease trap will be designed for installation if required by the local council/water authority.

5.4 Gas Supply

The existing gas meter located on the external wall of building at the SW corner of the building.

The current gas meter is an AL1000 and will provide a maximum of 1000MJ/h.

Gas load will be confirmed during detailed design.

The gas supply system will be designed in accordance with AS5601.

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6.0 FIRE PROTECTION

6.1 Existing Conditions

The only fire protection currently in the building is a few fire hose reels.

6.2 Proposed

The fire protection services proposed for this development will be designed in accordance with the Department of Health's guidelines, Building Code of Australia (BCA), relevant Australian Standard and local authority requirements including

Current relevant Australian Standards and in particular AS 3500

- Country Fire Authority
- AS 1851 Maintenance of Fire Protection Equipment
- AS 2419 Fire Hydrant Installations
- AS 2441 Installation of Fire Hose Reels
- AS 2444 Portable Fire Extinguishers and Fire Blankets
- AS 1841 Portable Fire Extinguishers
- AS 1851 Maintenance of Fire Protection Equipment

Early indications with the building surveyor indicate that following as a minimum will be required:

- Fire Hose Reels
- Fire Hydrants
- Fire Detection (refer electrical)
- Fire Sprinklers
- Fire Blankets in kitchen

6.3 Fire Hydrants

Hydrant coverage will be required throughout to comply with current regulations.

To establish the design pressure and flow information of the water supply in the street will be required.

Should the pressure and flow of the water in the water mains not meet the requirements for hydrant installation as laid out in the relevant Australian Standards, there is the possibility that fire pumps and tanks may be required. This will not be known until the pressure and flow details are known.

BRT would also like to review the existing hydrants in the street as these may be able to provide coverage to the building without the need of additional on-site hydrants.

Generally, hydrant coverage will be provided by internal hydrants as the building covers the whole site.

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6.4 Fire Hose Reels

There are a number of existing hose reels located onsite. Generally, hose reels will be retained and reused where possible. A number of existing hose reels are in non-compliant locations and need to relocated. A full review will be required with the new layout.

6.5 Sprinkler Protection

The general consensus is that the existing building will need to be sprinklered. Again, the pressure and flow data of the water in the water main will need to be assessed to see whether additional pumps and tanks are required. This has not been allowed for in the current budgets.

6.6 Smoke exhaust

Floor area of the stage and BOH needs to be confirmed. If this area exceeds 200m2 then current building code requirements stipulate smoke exhaust maybe required. This will need to be confirmed with the building surveyor once the final plans are confirmed.