

Council

RESERVE 15162 – MOUNT BARKER HILL –
BCA LIGHTING PLAN

Lighting Project Summary Report

Meeting Date: 28 September 2021

Number of Pages : 20

SUMMARY REPORT: LIGHTING OF MOUNT BARKER HILL

N56212

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1. Memo to Councillors, 9 June 2020, Lighting Tower Hill – BCA Consultants

Following enquiries made with local electricians and a subsequent Request for Quote, Perth-based BCA Consultants were instructed to produce a lighting concept design for illuminating the communications tower on Tower Hill. They have considerable experience in illuminating tall outdoor structures, notably the Bell Tower.

The process has involved a site visit and computer modelling to illustrate the expected results from various lighting products. Laser technology was discounted relatively late in the design process; although it is the best technology available for reaching long distances we were advised by BCA Consultants that it requires significant maintenance, an operator to run the equipment and an aviation licence. It is also extremely expensive – I was unable to get a firm quote for a laser installation as the units are all ‘price on application’, but it was indicated that it would be exponentially more than the wash light setup priced in the attached quote.

Please see the attached quote for a breakdown of product costs, and the accompanying modelling to illustrate the effects possible with the proposed lighting concept. The total quote for equipment is \$137,036.85 including GST.

Variations are possible:

- The first option is the quoted option, which includes illumination of the two/two and a half most prominent sides of the tower: the south east and south west façade. This allows for maximum coverage of the lighting on three sides.
- The second option is for the coverage of a single façade. This would reduce the cost by approximately \$50,000, and provide coverage of a single tower face with some moderate spill light, in this instance the entire face of one side of the tower.
- As part of the lighting scope 12m of LED flex and profile housing has been included, together with DMX control and power supply. This was proposed for illuminating the prospective boardwalk. This could be amended if required, saving approximately \$3,000.
- The cloud subscription and SIM card costs may not be necessary – it is possible to access the lighting controls on site rather than accessing through the cloud.

The following exclusions apply; ie the budget from BCA Consultants does not cover:

- Western Power application fees and associated DQA applications.
- Design and documentation required due to design changes after preliminary designs have been agreed to and we have commenced final design or documentation.
- Provision of pole mounted fixed brackets to support the mounting of light fittings.
- Design and documentation required due to any major changes or delays instigated or caused by others.

- Additional site visits, design and documentation required as a result of defects in construction.
- Additional site visits, or waiting time, resulting from building works being incomplete at the time an inspection is requested.
- Time for management of subcontractors or suppliers resulting from faulty workmanship, non-conformances, and warranty or delivery issues.
- Certificate of Design Compliance.
- Certificate of Construction Compliance.

We estimate it will cost up to a further \$50,000 to cover these exclusions, additional design, mounting, and trenching/electrical issues.

If Councillors decide to continue with this project the next stage would be a night test of the proposed equipment at the tower site. This is BCA's quote for continuing to the full lighting control design (including the night test):

Architectural Lighting Services	Fee Amount
Site Visit	\$2,000
Design Documentation	\$4,300
Lighting Controls & Programming	\$5,300
Testing and Commissioning	\$4,000
Total (Excl. GST)	\$15,600

Laura Adams
ECONOMIC DEVELOPMENT OFFICER

2. Mount Barker Radio Tower Lighting Design Concept Presentation, 8 June 2020, BCA Consultants

Appended to this summary report.

3. Memo to Councillors, 21 October 2020, Tower Hill lighting concept: equipment testing

At the July 2020 Council meeting it was resolved that BCA Consultants' lighting proposal for the communications tower at Tower Hill be progressed to the design and testing stage.

BCA Consultants have confirmed their plans for initial testing of the proposed equipment. They have managed to obtain two high-powered projector light fittings from a supplier located in the eastern states which are in the process of being dispatched to Perth.

BCA anticipates their delivery to Perth will be early next week, which will provide us with a unique opportunity to conduct live testing on site on 30 October 2020. They apologise for the short notice; the light fittings will only remain in Perth for a week before being sent back to the supplier.

The light fittings being tested are both floodlights. One will be fitted with a wide beam lens and the other a narrow beam lens. This will give an indication of the effect that can be expected with the proposed combination of lighting as per their initial concept designs.

BCA will project a sequence of lighting options onto the eastern aspect of the communications tower on the evening of 30 October – start time to be confirmed. Your participation is voluntary but would be very helpful, as we are seeking feedback on the effect from different vantage points. We will investigate suitable spots with a clear view of the eastern side of the tower and provide you with options, but on initial assessment having viewers based in Mt Barker townsite, on or near the Albany Highway, in Kendenup and out towards Porongurup would be beneficial.

We will communicate an outline of the plans to local residents via the Shire Facebook page. At the time of the testing we intend to temporarily shut the road leading up to the lookout for safety reasons.

Laura Adams
ECONOMIC DEVELOPMENT OFFICER

4. Memo to Councillors, 3 November 2020, Tower Hill lighting concept: equipment testing

On the evening of Friday 30 October 2020, BCA Consultants tested a sample of the proposed lighting fixtures for the communications tower in situ at Tower Hill.

The fixtures on loan from the Eastern States supplier comprised one wide-angle wash light, one narrow-beam wash light, and one projector spotlight, which can be programmed with an image such as a logo or pattern. The set-up on the night consisted of cabling, a control desk, a generator on loan from Works and Services, and several traffic control signs to restrict access to the hill summit. The lighting fixtures were large and heavy but able to be moved by two or three people carrying them.

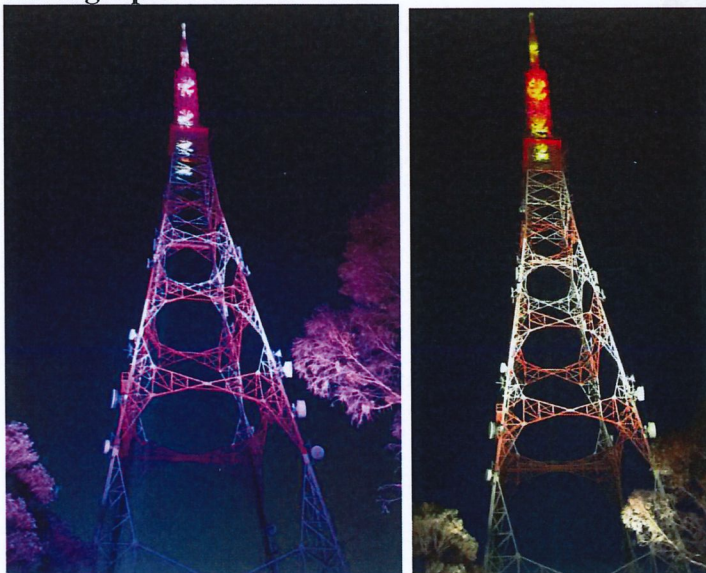
The lights were set up near ground level and measurements taken to inform the design of the concept plan. The intention is to design the layout with the lighting fixtures raised on pole-like structures that would deter theft and vandalism, provide optimal angles for illuminating the tower, and to enable installation in bushland without having to remove tree branches.

The testing program for the night started around 7pm with a series of tests of all three appliances, which had been set up around the edges of the car park to light the eastern face of the communications tower. Once the lights were placed at distances which enabled them to hit the top third of the tower, a series of colours and effects were tested: including projected patterns and setting the spotlight to move its beam up and down the tower.

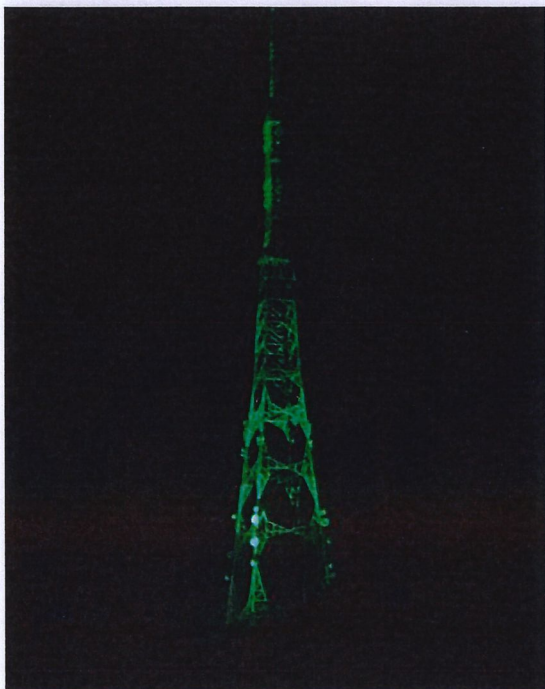
The original intention was to move the fixtures round to light the northern face of the tower, however due to the thick bush it was deemed impossible. The measurements taken from lighting the eastern face combined with levels taken on the northern side of the tower will be sufficient to inform the design. The wide-angle wash light was moved to the north-eastern corner of the tower to provide an impression of what lighting directed up the corner struts of the tower could achieve. This was effective and did not create significant spill light.

In addition to providing an idea of the effects achievable, these tests will inform BCA's proposal on how many fixtures would be required and where best to site them. Their next step will be to produce a design for the layout and installation of the equipment.

Photographs taken on-site



Photographs taken from distances and shared on social media



Public response

The plans for testing were communicated via the Shire Facebook page. Following the test, some photographs were posted accompanied by a request to email feedback to the Shire. Engagement with these posts has been high.

Engagement with the post announcing the tests (27 October)

45 Likes, 4 neutral responses, 2 negative responses.

Comments: 10 positive, 5 negative.

Issues raised (paraphrased for clarity):

- Appreciative comment for being given the opportunity to be involved in the trial.
- A comment about Council disregarding feedback already given against tower lighting and mountain bike trails.
- Concerns around expenditure of public funds.

- The disruption to the ‘nesting’ wedge-tailed eagles was raised several times.
- Lack of community consultation.
- Concerns about light pollution.

Engagement with the post inviting feedback on the tests by email (2 November)

79 Likes, 2 negative responses.

Comments: 23 positive, 7 negative.

Issues raised (paraphrased for clarity):

- Request for Council to disclose how much the testing cost, combined with a request as to why there hadn’t been opportunities for the public to decide whether to proceed with this project.
- Same concerns as before about wedge-tailed eagles.
- There is limited visibility from the highway.
- Great idea but needs to be brighter.
- Full moon didn’t help but it looked fantastic.
- It was good that there was no light spillage.
- If that’s as bright as it gets then concerns about light pollution are laid to rest.
- It’s not clear what doing this will achieve. Even if it did tempt tourists nothing is open in Mt Barker at night.
- Can’t see it from Kendenup and why are you lighting this when Kendenup doesn’t have streetlights.
- Lights at the Rec Centre for soccer players would be a better idea.
- Several comments that refer to assumptions about how much it’d cost.
- Good to see the Shire actually trying to showcase our town.

Feedback sent by email

- ‘If that’s what we get for a substantial cost just to trial it, it’s not worth it. I am not in favour of lighting the tower, I can’t see the point. It’s not going to drag tourists off the highway at night, nor do we want it to as its not the safest road even during the day. And during the day there’s nothing to see! Total waste of money!’
- ‘We live on Braidwood road at the base of the tower, and we loved it! We went for a bit of a drive along Braidwood road and then out to the big roundabout as you come into Barker from Perth just to see how it looks. Our feedback is:
 - We felt that it needs to be brighter, so that it can be seen from the Albany Hwy, other wise it sort of defeats the purpose of having it
 - It may bring considerably more traffic onto Braidwood and also Mokare Rd's. Braidwood might not be too bad but Mokare is very narrow and windy (I rolled my car there early one morning - and I drive it every day!). Perhaps this would need to be widened or one end blocked off. Making it one way would be very impractical for local residents.

All in all a great initiative from the Shire! Can't wait to see it permanently installed.’

- ‘Great initiative to light the tower, it could be a real drawcard for our town. Combined with a mountain bike trail from the lookout car park I think we could really capture some of the 1000’s of travelling couples/families that pass through town each week and give them a reason to stop day, and night.’

Laura Adams
ECONOMIC DEVELOPMENT OFFICER

5. Summary report from BCA Consultants, 23 July 2021

Appended to this report.

Mt Barker Radio Tower

Lighting Design

Concept Presentation

Date 08/06/2020

“every space deserves
great light”

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Wash lit building

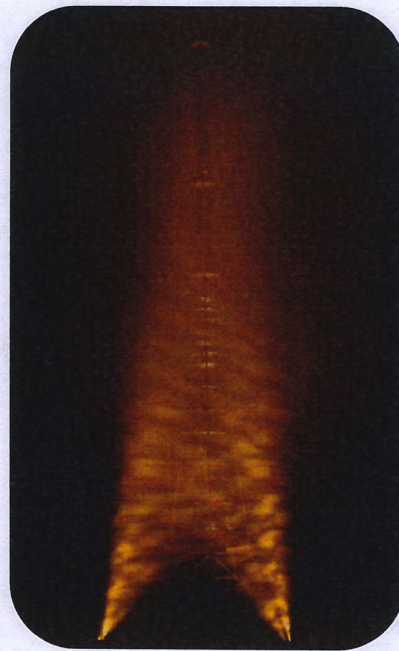
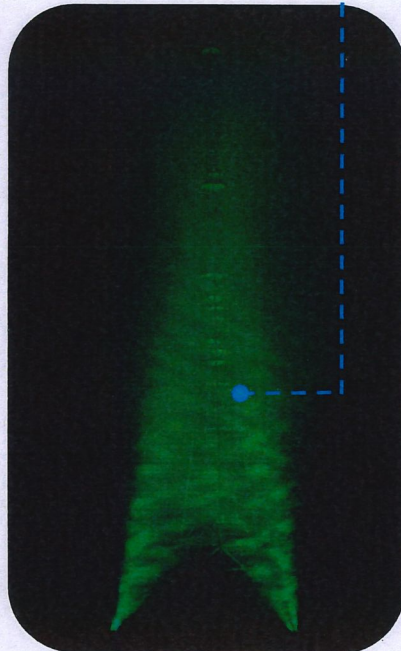
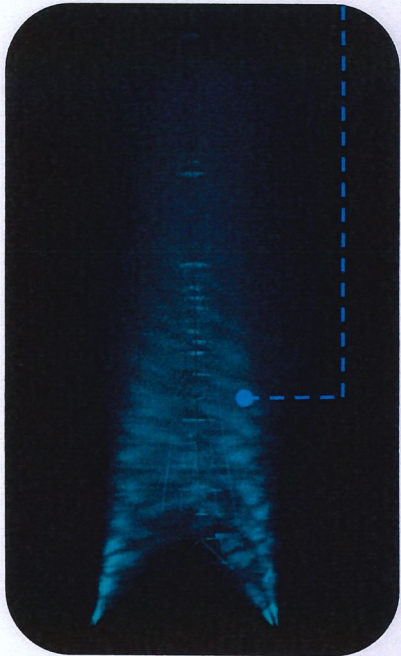
Wash lighting will give the tower a flood of colour all the way up the structure. As the tower is not a solid construction there will be spill light through and around the building.

Both LED and Discharge luminaires are available for colour changing wash lighting structures of structures the size of this tower. Some have static beams while others have the ability for movement as well.

Rendered examples of how the tower could look with colour changing wash luminaires.



Wash lit Structure



Wash lit tower



Colour changing building wash light

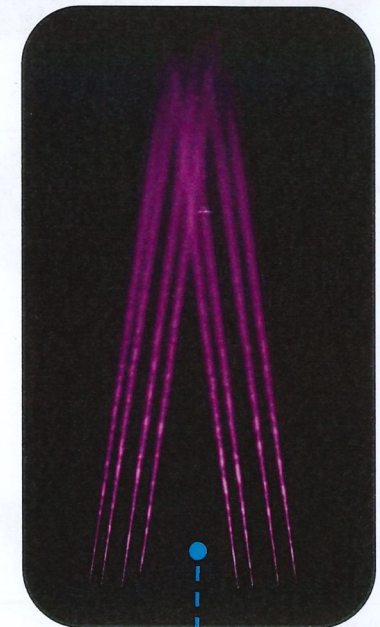


Examples from Vivid Sydney 2017

Surrounding the tower with waterproof narrow beam luminaires allows a look similar to search lights to be achieved.

However, unlike a standard search light these luminaires can be programmed to move and colour change .

Renders of how narrow beam luminaires could be utilised in the tower lighting design. Here they are able to smoothly move between different positions while changing colour individually or as a group.



Waterproof Narrow Beam Luminaire



Examples of Pattern Projectors



Waterproof Image Projector

Pattern projection is commonly used on smaller buildings. These patterns can be a static image or rotate at various speeds. The options for images are endless with hundreds of standard images available and custom images or logos can be quickly made.

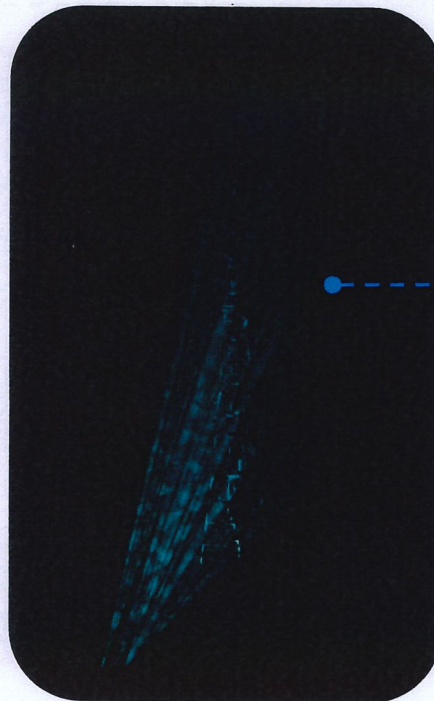
The same narrow beam luminaires can be zoomed out to cover the tower with pattern projection.

Patterns can be projected onto the surface of the structure. As the tower isn't a solid object these images will create shadow on the tower as well as forming interesting shadows through to the other side.

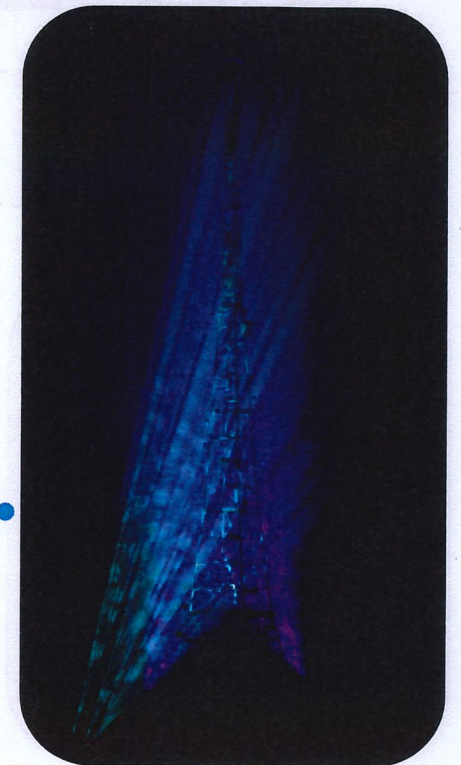
Here are some rendered images of how pattern projection could look on a tower structure.



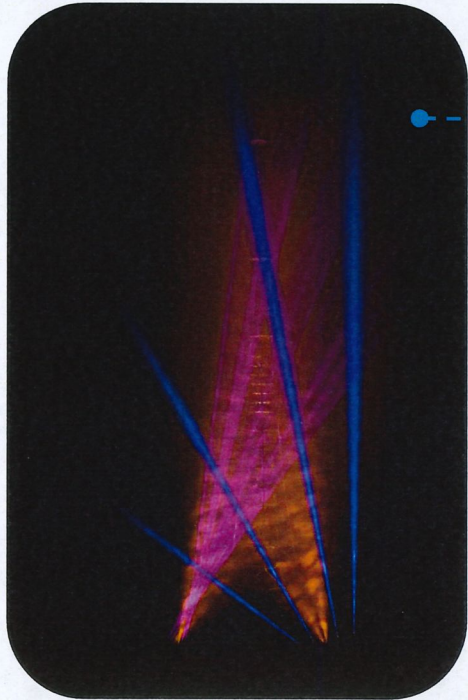
Examples of Pattern Projectors



Rendered Image of Pattern

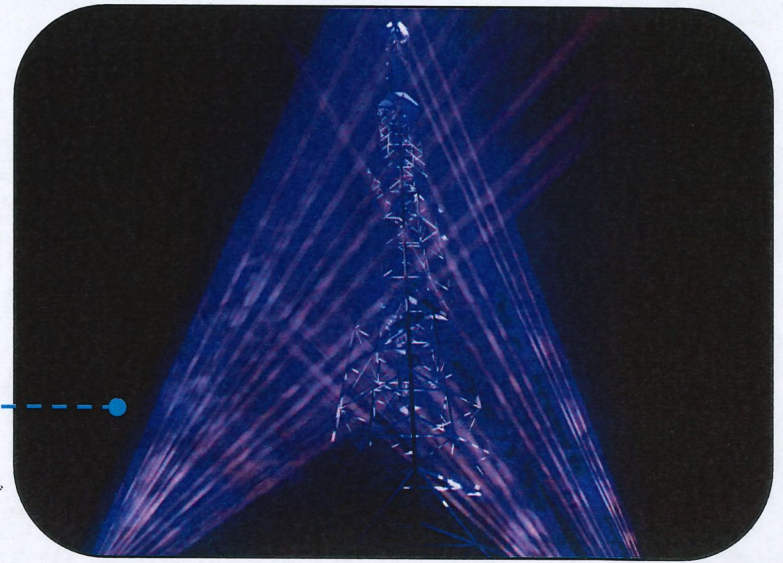


Pattern and Wash Lighting

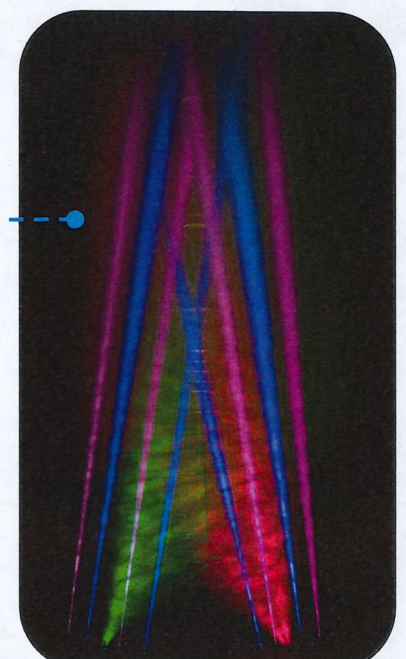
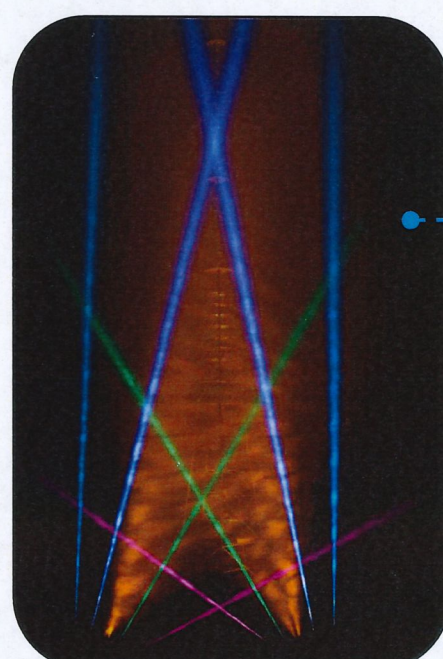
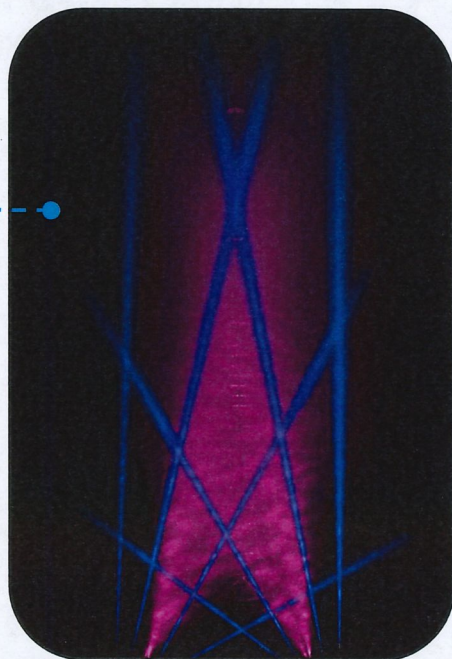
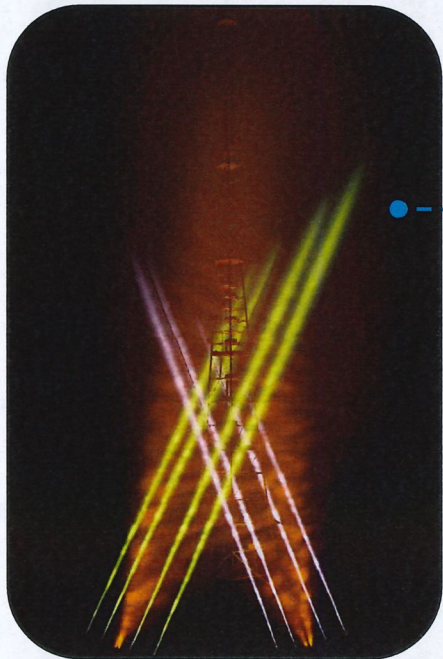


Wash, Pattern and Spots

With a combination of various types of lighting the options for static or moving lighting displays are endless. This structure can themed to suit any special occasion or be utilised as a backdrop for performances. Whatever occasion may arise this tower will be able produce a stunning lighting display.



Wash and Pattern



Combination of Luminaires

“We find beauty not in the thing itself
but in the pattern of shadows, the
light and the darkness, that one thing
against another creates.”



23/07/2021

Re: Mt Barker Tower Project

From our original testing last year we discovered that 33m from the tower was the ideal placement for the lights to avoid having them in the middle of the current carpark and therefore at risk of being damaged by vehicular collisions we have moved them to the corners of the tower on either side of the carpark. This has the added bonus of illuminating three sides of the tower instead of just the two. All calculations on power usage in this document have been undertaken using the lights from sunset to 10:00pm, and Sunset to 11:00pm. Council can select which curfew they wish to utilise.

Regardless of which option is selected the cost of control and programming will stay the same.

To get a basic colour wash on the tower there are two options:

1. 4 x Wide angle Flood Lights (line item 9 in regards to quote number 0056)
2 x Narrow Angle Flood Lights (line item 10)

This option would use 2500 watts of power which equates to 3400 kWh per year when run sunset to 10:00pm or 44 kWh per year when run sunset to 11:00pm.
This option would cover the entire tower with colour. It is not including line item 8 and therefore would reduce the quote by the cost of that line.

2. 2 x Wide angle Flood Lights
2 x Narrow Angle Flood Lights

This option would use 1600 watts of power which equates to approximately 2220 kWh per year when running sunset to 10 PM 10:00pm or 2800 kWh per year when running sunset to 11:00pm.

Eight of these lights would be approximately 3500 watts and be an additional 4700 kwh per year when run sunset to 10pm or 6000 kWh when run sunset to 11:00pm.

The current quote does not include for architectural lighting around the timber deck. This would be an extra cost

For the security of the lighting fixtures, we propose the installation of two aluminium trusses located in suitable position to assist with the prevention of vandalism.

The truss structure could be built as either a T shape or an upside down U shape. A structural engineer would need to sign off on the final design.

It would be advisable to keep a control box close to one of the truss structures to house the head end equipment. This would also be a good place for an electrical box as well.

As there has already been talk of renovating the entire area I think that it would be worth future proofing the quantity of power run to the site. This would allow for future carpark lighting and the future ablution blocks.

Our Recommendation

Should the project go ahead in the future, our recommendation would be to place the lighting fixtures at approximately 30 meters from the North East and south East corners of the tower fence line.

From this location the tower will be illuminated on the three most prominent sides for maximum visual effect. This would include lighting the base of the tower so tourists can take selfies at night. To achieve full tower

illumination I would recommend one narrow angled flood focused to the tip of the tower and two of the wide-angle floods per side (one focused on the mid-section of the tower and one on the base).

The photograph below demonstrates how one narrow beam flood (in pink) and one wide beam flood (in red) look on the tower. When there is a second wide beam flood on the near side of the tower and the Northern side is also lit the tower would be far more evenly illuminated.

The third luminaire tested was the moving head narrow beam spotlight. This luminaire has many additional functions than the previous two luminaires that were created solely for colour changing. This luminaire can be programmed to pan and tilt, split into multiple beams (prism), project patterns (with hard or soft edges), rotate the patterns (at various speeds) as well as change colour. This luminaire is seen in the photograph as the 5 white lines.



Area above Tower platform. Lit by one narrow beam flood light.

Area below Tower platform. Lit by one wide beam flood light.

The control system used for the lighting test was a theatrical lighting desk which would not be a suitable option for a permanent install. A computer based architectural lighting control system would be utilised for the project. The head end of this system would be on site with the data from the lights plugged into it. This system would be programmed to turn the lights on at dusk and then off again at the agreed upon curfew time. During its run time it would play the "scene" that it has programmed to run that night. These can vary from day to day, season to season, or be something specific for special days of the year. There is an option for the system to be run over the internet so it can be remotely accessed. This means if you wished to change the colour at an unscheduled time you could remote access in and select the scene or colour you wanted.

Colour Tones

The luminaires specified have a wide range of colour options, all of which can be programmed and stored at various levels. The council would have the final decision on colour palettes and would have the control to change them at their discretion. We can pre-program a variety of different looks that would be suitable to use on different occasions throughout the year. These can then be overridden if required. We would

recommend a selection of seasonal colour palettes of golden tones for Summer, reds and burnt oranges for Autumn, blues for Winter and pinks and purples for Spring. These could correspond with various other significant days including Anzac Day, Valentine's day and breast cancer awareness week.

Positioning of the Tower light fittings

There are a few different options for luminaire positioning depending on light quantities and other uses to the area.

- 4 wide angle floods, 2 narrow beam flood
Half the luminaires placed facing the South-eastern corner and half placed facing the North-eastern corner.

Installation Requirements

Given that the location is accessible to the general public I would recommend some security for the lighting fixtures and control system. The control system is a small computer interface that needs to stay dry. This could easily be worked into the proposed ablution block in a locked cupboard, depending on future construction. If the ablutions are postponed a secure accessible box would be sufficient. The lights should all be mounted on a permanent truss structure. This should be fenced and or have anti climbing spikes on all of its uprights. The luminaires are all under 35kg, so while heavy they are not so heavy that they couldn't be removed by two or more individuals.

Running costs

The lighting system would be run from dusk until curfew. AS/NZS 4282:2019 Control of Obtrusive Effects of Outdoor Lighting states "curfew period, should be taken as being between 11 p.m. and 6 a.m." This curfew time could be brought back to 10 pm during the winter months as people are less likely to be out and about late at night.

To use just flood lights on the tower (4 wide beam and 2 narrow beam) would take 2880W of power to run. There is also a requirement for a small amount of power for the control system, enough to run a computer.