THE STAR

THE STAR
MOD 13
ELECTRICAL INFRASTRUCTURE REPORT

PREPARED BY UMOW LAI

Umow Lai

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Date	Revision No.	Issue Description	Prepared By	Reviewed By	Approved By
27.03.17	A	Issue for Comment	PR	MIG	PJ
22.06.2017	B	Comments Incorporated	PR	MIG	PJ
03.07.2017	C	Ausgrid Response Included	PR	MIG	PJ
22.08.2017	D	Comments Incorporated	PR	MIG	PJ
15.09.2017	E	Comments Incorporated	PR	PJ	PJ
31.01.2018	F	Final Issue	PR	PJ	PJ

THE STAR

1 EXECUTIVE SUMMARY

Star Entertainment Group Limited (SEGL) has commenced a five-year redevelopment journey to create a landmark, exemplar integrated resort. This proposed redevelopment will occur through the lodgement of two s75W modification applications to the original Major Project Approval (MP08_0098) with the Department of Planning and Environment (the Department).

Modification 14 (Mod 14) was determined in October 2017 and included approval for a range of upgrades to the existing site. These upgrades included the enclosure of the level 3 terrace to facilitate an expansion in gaming floor area and a new bar and restaurants, expansion of the level 3 pre-function space, changes to the Astral Hotel lobby and retail space, and alterations to internal vertical transportation, services and infrastructure, including the harbour heat rejection system.

Mod 13 is a modification to the development as approved under MP08_0098, up to and including Mod 14. This forms the basis for technical impact assessments.

Modification 13, proposes the development of a new Ritz-Carlton Hotel and Residential Tower in the northern portion of the site with associated podium treatment, as well as other transport, retail, food and beverage improvements across the site. It is **Modification 13** that is the subject of this report.

The purpose of this report is to make recommendations regarding available infrastructure and required upgrade works for the following services;

- Power Supply
- Communications

The proposed development has been assessed against all relevant standards/guidelines, including the following:

- Building Code of Australia
- Relevant Australian Standards
- Ausgrid
- Telstra
- Application number MP08_0098 MOD 13, relevant clauses;

10. Infrastructure

Detail any infrastructure proposed to service the development and demonstrate that the site can be suitably serviced.

Detail the existing infrastructure on site, and identify any possible impacts on infrastructure (particularly the light rail) arising from the construction of the proposed development.

Where the proposed works affect existing infrastructure, the application should detail any mitigation works proposed, including service relocations.

Prepare an Infrastructure Management Plan. The applicant shall provide information on the required water and waste water services, electricity and gas and any augmentation of Sydney Water and RMS and Light Rail infrastructure that may be required for the proposed development.

This Electrical Infrastructure Assessment has identified the following key findings/conclusions and recommendations:

- AUSGRID have advised that their existing high voltage network has insufficient capacity to support proposed site load for the Mod 13 & Mod 14 developments
- Preliminary discussions with Telstra suggest that the existing local network will not require any upgrades to support the Mod 13 & Mod 14 developments
- Application has been made to Ausgrid to undertake a detailed planning study of four options to upgrade the site supply capacity to accommodate the proposed works.
- Ausgrid's response to the application has been received providing two options for consideration. MC16028 / SC09203 – The Star Casino 80 Pyrmont St Pyrmont - Load Increase - System Planning Advice dated 26 June 2017
- The Star has issued a request to Ausgrid for a staged power increase via new 11kV feeders from the Darling Harbour Zone Substation.

2 SITE DESCRIPTION

2.1 SITE LOCATION AND DESCRIPTION

The subject site (the site) is located at 20-80 Pyrmont Street, Pyrmont, which is legally described as Lot 500 in DP1161507, Lot 301 in DP 873212 (SP56913), and Lot 302 in DP873212. The site also accommodates a light rail line (including 'The Star' light rail station) legally described as Lot 211 in DP 870336. The service road to the north of the site, comprising Lot 1 in DP 867854 and Lot 201 in DP 867855, is also part of the proposal under **Modification 13**.

The site is bounded by Pirrama Road to the north-east, Jones Bay Road to the north-west, Pyrmont Street to the south-west, Union Street to the south and Edward Street to the east. The location and configuration of the site is shown in Figure 1 below.

The site is leased by SEGL from the Independent Liquor and Gaming Authority (ILGA). SEGL is a leading operator of integrated resorts that appeal to both local and international visitors. SEGL is the operator of The Star Sydney (The Star), with a casino licence to operate a casino through to the year 2093.

The site has a total area of 39,206 m^2 (excluding Lot 1 in DP 867854 and Lot 201 in DP 867855 to the north), and is occupied by the existing integrated resort which includes a multi-storey entertainment facility, gaming areas, retail spaces, multiple restaurants and bars, the Sydney Lyric Theatre, 480 hotel rooms/serviced apartments across three towers, and basement parking.

Figure 1 *– Aerial Image of the Subject Site (base map source: maps.six.nsw.gov.au)*

2.2 LEGAL DESCRIPTION AND OWNERSHIP

The site comprises the following lots as shown in the **Table 1** below.

Table 1 – Legal Description and Ownership

Details	Uses	Ownership
Lot 211 in DP 870336	The Light Rail Corridor	Owned by Rail Corporation New South Wales
Lot 500 in DP 1161507	The Star site	Owned by the ILGA, leased by SEGL
Lot 301 in DP 873212	Astral Hotel	Owned by the ILGA, leased by SEGL
Lot 302 in DP 873212	Astral Residences divided into strata (Strata Plan - SP 56913);	Stratum owned by the ILGA, leased by SEGL
Lot 1 in DP 867854	Service road	Owned by the ILGA, leased by SEGL
Lot 201 in DP 867855	Service road	Owned by the ILGA, leased by SEGL

Figure 2 *– Legal Description of the site (base map source: maps.six.nsw.gov.au)*

3 DESCRIPTION OF MOD 13 IMPROVEMENTS

New Ritz-Carlton Hotel and Residential Tower

- Demolition of part of the existing building in the northern portion of the site, including part of the Pirrama Road façade and part of the Jones Bay Road façade.
- Construction of a new Tower, 237.0 metres AHD (approximate, 234 metres from Pirrama Road);
- Residential uses across 35 levels, comprising:
    - A residential vehicular drop off lobby on Level B2
    - A residential lobby on Level 00 to be accessed from Jones Bay Road;
    - Residential communal space on Level 07 to be accessed via Level 08; and
    - 204 residential apartments located from Levels 05 to 06 and from Levels 08 to 38, featuring one-bedroom, two-bedroom and three-bedroom unit types (Note – no Level 13)
- Hotel uses across 31 levels, comprising:
    - A hotel arrival lobby on Level B2 to be accessed from the new Ritz-Carlton porte-cochere along Pirrama Road;
    - A hotel Sky Lobby for guest check-in on Level 39 and 40, featuring a restaurant, bar and lounge;
    - 220 hotel rooms located from Level 42 to 58 and from Level 60 to 61
    - A hotel spa and gym on Level 07
    - A VIP link to the Sovereign Room on Level 04 and 04 Mezzanine
    - A Ritz-Carlton Club lounge and terrace on Level 59
    - Hotel staff end-of-trip facilities on Level B3
    - Hotel staff arrival point on Level 00
    - Hotel back-of-house and plant on Level B2, 02, 03, 05, 41 and 42
- A Neighbourhood Centre consisting of the following proposed uses including street level cafe, library, learning / innovation hub, multipurpose function centre, practice rooms (functional use to be finalised in conjunction with a neighbourhood panel)
- A new car-parking stacker system below the new porte-cochere of the Ritz-Carlton Hotel, with a total capacity of 221 spaces, to serve the new hotel and apartments
- Vertical transport associated with the tower and podium; and
- A new drop-off / pick up area (short-term parking) on Jones Bay Road for the proposed apartments.

Level 07

- A 'Ribbon' at Level 07 connecting the new Hotel and Residential Tower to the existing building along Pirrama Road, comprising:
    - Two pools and associated pool decks (one for the new Hotel, one for The Star); and
    - Two food and beverage premises with associated store rooms and facilities;
- Lift access from the Level 05 Terrace to Level 07;

- Residential communal open space associated with the new residential apartments, comprising pool and landscaped terrace at the base of the Tower adjacent to Jones Bay Road;
- Gym and associated change rooms and facilities for the residents;
- Gym and associated change rooms and facilities for hotel guests; and
- Landscaping treatments.

Level 05 Sky Terrace

- Three food and beverage outlets with external areas;
- Completion of the Vertical Transportation drum to connect with Level 05 Sky Terrace;
- Designated event spaces on the Terrace; and
- Landscaping treatment.

Level 05 Astral Hotel Pool and Spa Recreational Facility Upgrade

- New pool deck, pool, spa, gym and amenities upgrade for Astral Hotel and Residences.

Tower to Sovereign Link by Escalator and Lift

- Link from the Tower (across Level 04 and Level 04 Mezzanine) to the Sovereign Resort and MUEF at Level 03, connected via Lift G4, Lift VIP 1 and escalators.
- Extension of the lift service to stop at Level 00, 01 and 05 in addition to Level 3, 4 and 4M.

Level 03 Sovereign Column Façade Treatment along Pirrama Road

- New glazed detail to enclose exposed Level 03 Sovereign columns along the Pirrama Road façade.

Various reconfiguration works around Vertical Drum Level 00 to L5

- Revolving door at L00 main entrance landing Pirrama Road end
- Sliding door at L00 landing at stairs from Light Rail
- Reconfiguring of existing L1 and 2 void edge
- New escalators from L2 to L3 due to revised landing at Level 3
- Infill of L2 atrium void to main entrance at Pirrama Road

Façade Integration Works

- Upgrades to the Pirrama Road and Jones Bay Road façades to integrate the new Ritz Carlton Hotel and Residential Tower with the existing building.

Infrastructure Upgrades

- A new plant room located within the podium over Levels 03, 04, 05 and 06 of the proposed Hotel and Residential Tower;
- Relocation of the current Level 03 cooling towers (adjacent to the MUEF) to the Level 09 plant room above the Level 06 plantroom adjacent to the Astral Hotel;
- New capstone microturbine units and associated flues in the proposed plant room at Level 03 between the Darling Hotel and the Astral Residence Tower;

- New capstone microturbine units and associated flues in the new Level 03 plant room at the base of the Tower;
- Relocation of the existing main switch-room to the new plant room on Level 02, south of the demolition cut line;
- Relocation of the existing data recovery centre to the new plant room on Level B1 of the Darling Hotel;
- Relocation of diesel generator flues to the side of the new Level 09 plantroom, adjacent to Astral Hotel

Level B2 Transport Interchange

- Upgrades to the Event Centre Loading Dock;
- Entry into Basement car stacker for the Tower apartments and Ritz-Carlton Hotel;
- New commuter bike parking and hire bike system;
- Upgrade of finishes to light rail station surrounds (but not within Light Rail corridor) and removal of existing wall barrier to the Pirrama Road frontage;
- Upgraded taxi-rank arrangements;
- Designated Star coach parking along Service Road in front of Light Rail station; and
- Realignment of kerbs and line-marking.
- Note – no works within the Light Rail corridor

Transport Improvements – Other Locations

- Reconfiguration of existing median strips on Jones Bay Road and addition of new median strip on Pyrmont Street, with associated line-marking to enable a new right-hand turning lane into the Astral Hotel Porte-Cochere;
- New Pyrmont Street carpark entry and exit, associated line marking, changes to internal circulation, and reconstruction of the pedestrian footpath along Pyrmont Street; and
- Relocation of existing feeder taxi-rank from Jones Bay Road to the Level B2 transport interchange.

Site Wide Landscape and Public Domain Upgrades

- Upgrades to street frontages along Pirrama Road (for the Hotel Porte Cochere) and Jones Bay Road (for the residential entry);
- Upgrades to street frontage to Pyrmont Street, due to new car parking entry; and
- Upgrade to the entry forecourt of SELS building at the corner of Jones Bay Road and Pyrmont Street. (Note: no works within SELS building is proposed)

Level 00 - Restaurant Street

- Creation of a new destination Restaurant Street by:
    - Incorporating existing Balla & Black Food and Beverage premises on Level 00; and
    - Converting existing retail shops into new Food and Beverage tenancies

Pirrama Road and Jones Bay Road - Food and Beverage tenancies

- A revised food and beverage tenancy at the existing Pizzaperta outlet along Pirrama Road;
- A new food & beverage tenancy at the Marquee street entry; and

- A small café outlet adjacent to the residential lift lobby at Jones Bay Road.
- A new food & beverage tenancy accessed off existing walkway from Jones Bay Road

Food and Beverage – Other Locations

- Reconfiguration of Harvest Buffet, including new escalators from Level 00 Food Court to Level 01; and
- Refurbishment of Bistro 80 into the interim Century tenancy. (Note: The Century tenancy post construction is proposed to be at the Jones Bay end of L00 – Restaurant Street

Darling Hotel Corners

- Upgrade of the corner plaza at the Union/Edward Street property entry to accommodate:
  - A new food and Beverage premises on Level 01 and 02;
  - A new entry foyer leading to the Food Court;
  - A relocated awning enclosure at street level;
- Upgrade of the corner plaza at the Union/Pyrmont Street property entry to accommodate:
  - A new awning enclosure at for the existing café;
  - New revolving door at entry to Darling Hotel
  - Eight (8) luxury display cases at Darling Hotel car park entry; and
  - Two car display areas at Darling Hotel car park entry.

Site-Wide Acoustic Strategy

- A site-wide acoustic monitoring strategy applied to assess impact of potential noise generating sources in Mod13.

Site-Wide Lighting Strategy

- A site-wide lighting strategy integrating and improving the existing lighting across the precinct, with new lighting the proposed Tower, Podium and Ribbon, including:
  - Internal lighting of Hotel and Residential spaces;
  - Illuminated highlights at the Sky Lobby and Club Lounge levels;
  - Integrated lighting on the eastern and western vertical façade slots and angled roof profile;
  - Podium external illumination from awnings, and under retail and lobby colonnades;
  - Landscape lighting on Level 07 open terraces and pool decks;
  - Feature lighting accentuating the wing-like profile of the Ribbon and vertical element;
  - Internal and external lighting to Food and Beverage outlet at Union/Edward Street corner;
  - Façade LED lighting to the heritage SELS Building

Special Lighting Events

- Approval for fifty-three (53) Special Lighting Events per year for the use of permanent installation of moving projector lights on the rooftop of the Astral Hotel

Signage Upgrades

- Consolidation of existing signage approvals and new signage, including:

- Approved signs
- Wayfinding signs;
- Business identification (including for Food and Beverage outlets); and
- Signage on the Tower and Podium.

Stormwater upgrades

- Stormwater upgrade works, including increased pit inlets and pipe capacities at the low points along Pyrmont Street and Edward Street.

4 ELECTRICAL SERVICES

Electrical and communications services carriers have been contacted and development plans have been discussed.

4.1 PROJECTED MAXIMUM DEMAND

The existing site maximum demand is 12.2 MW

The projected maximum demand for the proposed Mod 13 & 14 developments is 7.4 MVA.

The projected total existing & Mod 14 & Mod 13 site maximum demand is 19.8 MW.

Of the total load increase approximately one third is additional chiller load, one third is for the new build areas and one third is for additional infill areas within the existing site footprint.

4.2 AUSGRID NETWORK CAPACITY

AUSGRID have advised that their existing high voltage network has capacity to support only the existing site maximum demand of 12.2 MW, which is insufficient to support the projected load.

4.3 AUSGRID APPLICATION

The Star submitted a revised application to Ausgrid on the 29th September 2016.

The application requests Ausgrid to undertake a detailed planning study of 4 options to upgrade the site supply capacity from 12.2MVA to 17.5MVA to accommodate the proposed works.

The four options being considered include:

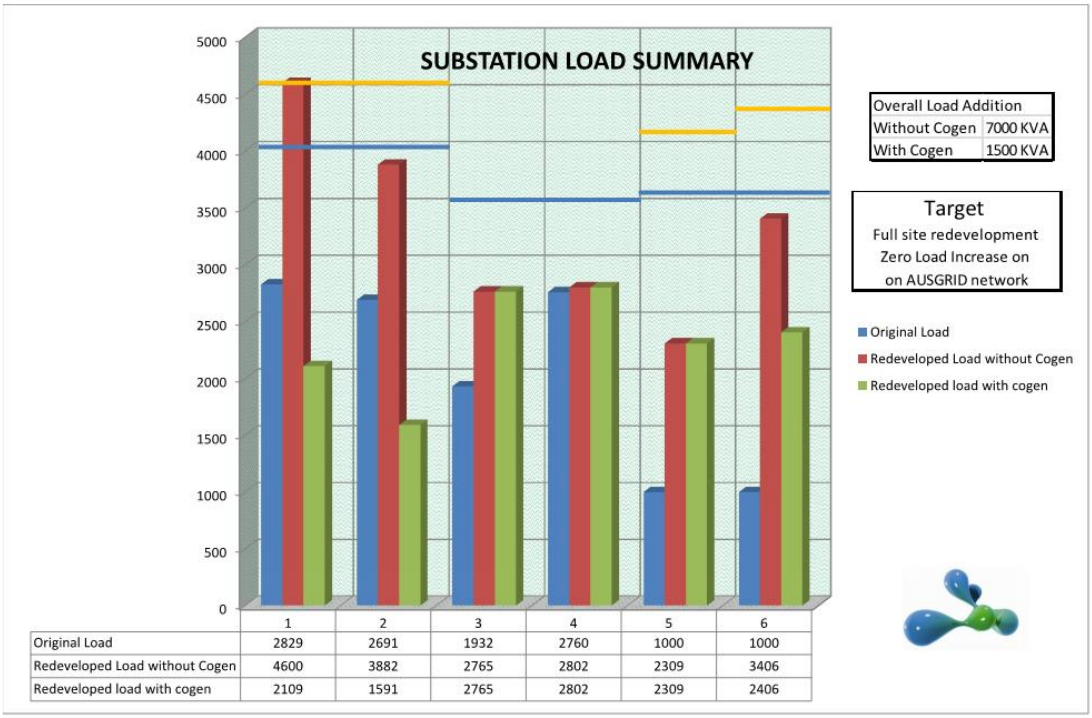
1. Upgrading of the existing Darling Harbour zone substation and provision of a new 11KV feeder
2. Installation of parallel tri-generation on the low voltage network
3. Installation of parallel tri-generation on the high voltage network
4. Provision of a 33KV network to the site from the Pyrmont Sub-transmission network

For each of the 4 options, we have requested Ausgrid to provide:

- Estimates of the order of costs.
- Estimated time frames to implement the upgrades
- Details of the technical considerations and any limitations.

Refer to Appendix A of this report for a copy of the submitted application.

The following graph provides a summary of the existing and proposed load situation for the development proposal.



	1	2	3	4	5	6
Original Load	2829	2691	1932	2760	1000	1000
Redeveloped Load without Cogen	4600	3882	2765	2802	2309	3406
Redeveloped load with cogen	2109	1591	2765	2802	2309	2406

Figure 3 *Existing and Proposed Substation Load Summary*

4.4 AUSGRID RESPONSE AND REVISED APPLICATION

Ausgrid's response to the application has been received providing two options for consideration. *MC16028 / SC09203 – The Star Casino 80 Pyrmont St Pyrmont - Load Increase - System Planning Advice* dated 26 June 2017, including;

- New 33kV feeders from Pyrmont STS
- New 11kV feeders from Darling Harbour zone substation and upstream 11kV network augmentation

The Star has undertaken a review of the proposed options with consideration to buildability, operational disruption and suitability to the ongoing requirements of the development.

Following this review, The Star has issued a request to Ausgrid for a staged power increase via new 11kV feeders from the Darling Harbour Zone Substation.

Refer to Appendix B for a copy of The Star's *Connection Application* dated 09/01/2018. This application includes Ausgrid's *Load Increase - System Planning Advice* Letter.

5 COMMUNICATIONS SERVICES

5.1 NETWORK CAPACITY

5.1.1 Existing Network Capacity

Umow Lai have had preliminary discussions with Telstra on the necessity to augment any street infrastructure. At this stage it is not expected that Telstra will be required to undergo any network upgrades to support the Mod 13 & Mod 14 developments.

5.1.2 Existing Site Communications Augmentation

The existing site consists of

- A Building Distributor and MDF located on level 4. This building distributor distributes both fibre and copper cabling throughout the site.
- A secondary redundant path distributor on level 2 in the north eastern corner of the site.
- A dedicated building distributor for the Darling Hotel

The development will include additional onsite Data Hubs and cabling infrastructure as necessary to serve the additional and re-developed areas.

The existing telecommunications incoming carrier network has sufficient capacity to serve the additional site development.

The incoming carrier service currently terminates in the Data Recovery Centre, which is located on L02 at the Northern end of the site in the proposed Mod 13 demolition zone. Umow Lai is liaising with Telstra to relocate the incoming carrier service clear of the development footprint.

6 CONCLUSION

The proposed Electrical Infrastructure works will be designed and constructed in accordance with;

- Building Code of Australia
- Relevant Australian Standards
- Ausgrid Requirements and Guidelines
- Telstra and Guidelines
- Application number MP08_0098 MOD 13, relevant clauses;

The Electrical Infrastructure Management Plan addresses the SEARs Application, number MP08_0098 MOD 13, relevant clauses including;

- *The applicant shall provide information on the electricity infrastructure that may be required for the proposed development.*

This Electrical Infrastructure Assessment has identified the following key findings/conclusions and recommendations:

- AUSGRID have advised that their existing high voltage network has insufficient capacity to support proposed site load for the Mod 13 & Mod 14 developments
- Preliminary discussions with Telstra suggest that the existing local network will not require any upgrades to support the Mod 13 & Mod 14 developments
- Application has been made to Ausgrid to undertake a detailed planning study of 4 options to upgrade the site supply capacity to accommodate the proposed works, including;
    1. Upgrading of the existing Darling Harbour zone substation and provision of a new 11KV feeder
    2. Installation of parallel tri-generation on the low voltage network
    3. Installation of parallel tri-generation on the high voltage network
    4. Provision of a 33KV network to the site from the Pyrmont Sub-transmission network
- Ausgrid's response to the application has been received providing two options for consideration. *MC16028 / SC09203 – The Star Casino 80 Pyrmont St Pyrmont - Load Increase - System Planning Advice* dated 26 June 2017, including;
    1. New 33kV feeders from Pyrmont STS
    2. New 11kV feeders from Darling Harbour zone substation and upstream 11kV network augmentation
- The Star has undertaken a review of the proposed options with consideration to buildability, operational disruption and suitability to the ongoing requirements of the development.
- Following this review, The Star has issued a request to Ausgrid for a staged power increase via new 11kV feeders from the Darling Harbour Zone Substation.

APPENDIX A – AUSGRID APPLICATION

Preliminary enquiry

FORM NECF - 01

When to use this form

If you have a specific enquiry related to:
- establishing a new connection to the Ausgrid network, or
- modifying an existing connection to the Ausgrid network, or
- relocating existing Ausgrid electrical network assets, and

our Connecting to the Network section of the website has not answered your question, then use this form to help us respond to your enquiry.

A preliminary enquiry is also required for some larger connections. You should refer to the NECF-01 Form Guide if you are intending to register or require an exemption in accordance with the National Electricity Rules, to ensure you include the appropriate information.

For all other Ausgrid enquiries call us on 13 15 35 or go to Ausgrid Contact Us (http://www.ausgrid.com.au/Common/About-us/Contact-us) on the Ausgrid website

How to submit this form to Ausgrid

Sydney, Central Coast and Hunter
Fax: (02) 4399 8007
Fax (local call): 1300 662 089
Email: datanorth@ausgrid.com.au

Upper Hunter only
Fax: (02) 6542 9037
Email: datamuswellbrook@ausgrid.com.au

A charge of $230.28 per hour (GST incl.) applies for provision of initial advice, refer to the NECF-01 Form Guide for further details

Fields marked with an * are mandatory

PART A: PREMISES AND DEVELOPMENT DETAILS

1. About you - the enquirer

Title, first name, last name *	Phone number * (and/or)
Mr Peter Reedy	02 9431 9431
Postal address *	**Mobile phone number ***
PO Box 103, St Leonards, 1590	0428 247 915
Email address *	**Fax number**
peter.reedy@umowlai.com.au	

2. Type of Enquiry (select one or more) *

Related to the relocation of Ausgrid's electricity network assets	☐			Refer to the NECF-01 Form Guide for the additional information requirements.
Related to a new or altered load connection - less than 10MVA	☐	- 10MVA or greater	X ▶	
Related to an Embedded Generator (EG) connection - less than 5MW	☐	- 5MW or greater	X ▶	Complete Part B of Form if EG is 5MW or greater

3. Premises details and location diagram

NMI		Meter number		
Floor number	**Unit number**	**Street number or RMB ***	**Lot number ***	**DP number ***
		80 or		

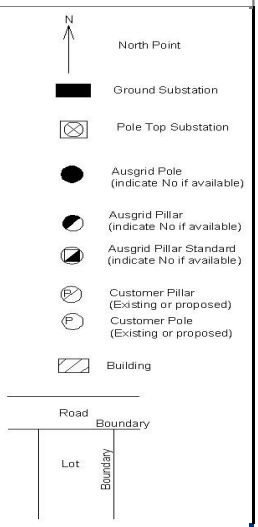
Street name * The Star Casino - 80 Pymont Street

Post code * 2009

Suburb * Pyrmont

Nearest cross street Jones Bay Road

Diagram * Please draw a location diagram of the proposed relocation or connection works or EG to be connected, using the following symbols as needed



4. Your question(s)? Include comments or attach additional information as specified in the NECF-01 Forr

We are requesting Ausgrid to undertake a planning study of 4 options to upgrade the supply capacity from the current total site load of 12.2MVA to 17.5MW with trigen (or to 19MW with no trigen).

For each the 4 options, please provide:
1. Estimates of the order of costs,
2. Estimated time frames to implement the upgrades,
3. Details of the technical considerations and any limitations.

Please refer to the attached schematic diagrams showing the arrangement of the 4

Street Address of the Premises *	Post Code*
The Star Casino - 80 Pymont Street Pyrmont	2009

PART B: EG 5MW OR GREATER DETAILS (only complete Part B if your enquiry relates to an EG 5MW or greater)

5. Information to be provided with Preliminary Enquiry

(a) Type of plant – (eg. gas turbine generating unit; rolling mill, etc.)

(b) Preferred site location – ('as above' only or listing any alternatives in order of preference as well)

(c) Maximum power generation or demand of whole plant – (maximum MW and/or MVA, or average over 15 minutes or similar)

(d) Expected energy production or consumption (MWh per month), or daily load profile

(e) Plant type and configuration – (eg. number and type of generating units or number of separate production lines)

(f) Nature of any disturbing load (size of disturbing component MW/MVAr, duty cycle, nature of power electronic plant, which may produce harmonic distortion)

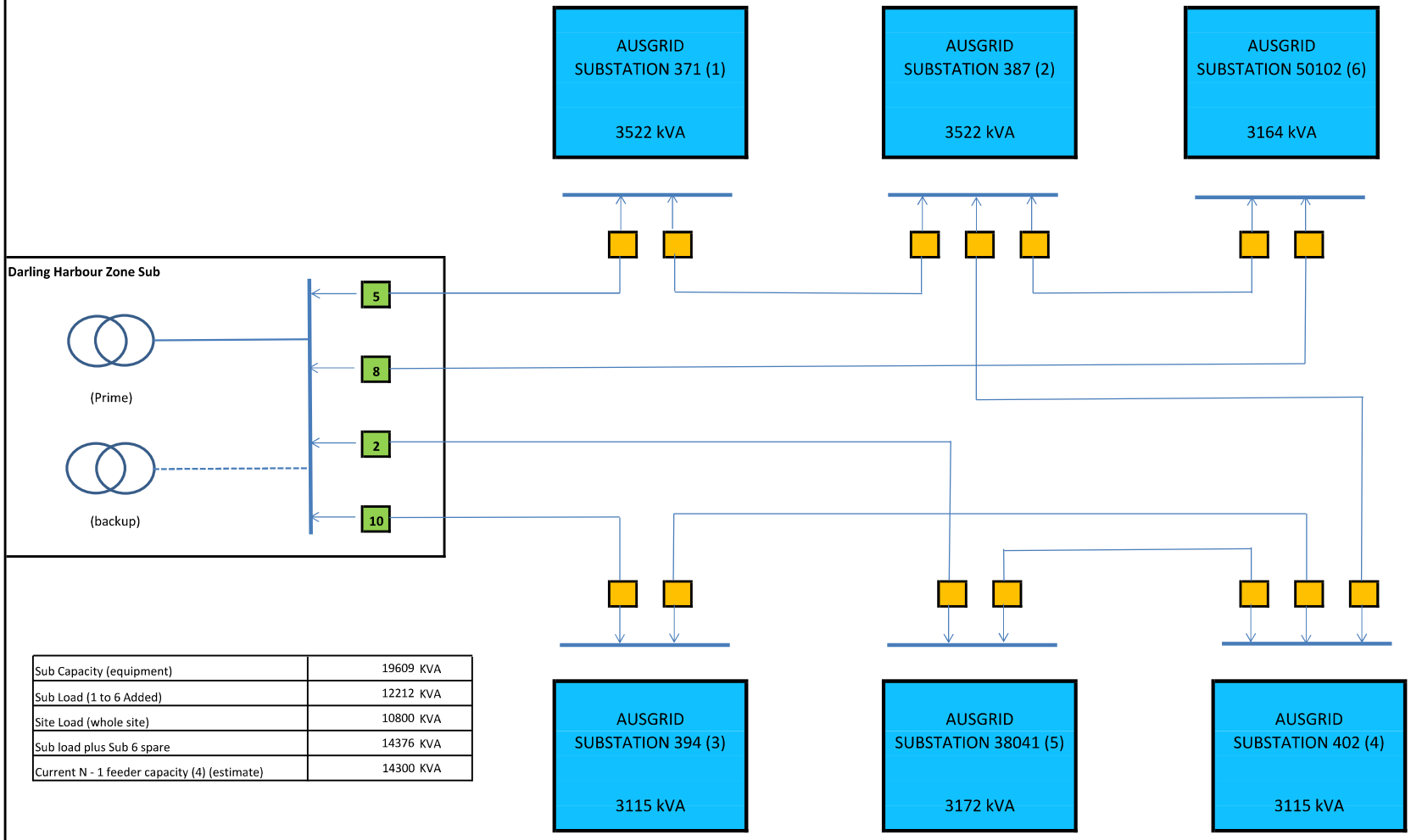
(g) Technology of proposed generating unit (e.g. synchronous generating unit, induction generator, photovoltaic array, etc.)

(h) When plant is to be in service – (eg. estimated date for each generating unit)

(i) Name and address of the party for whom the enquirer is acting, (if applicable)

(j) Other information, such as capacity and timing of power required during construction or any other auxiliary power requirements, energy storage details, or registration or exemption application and/or AEMO response

EXISTING AUSGRID NETWORK

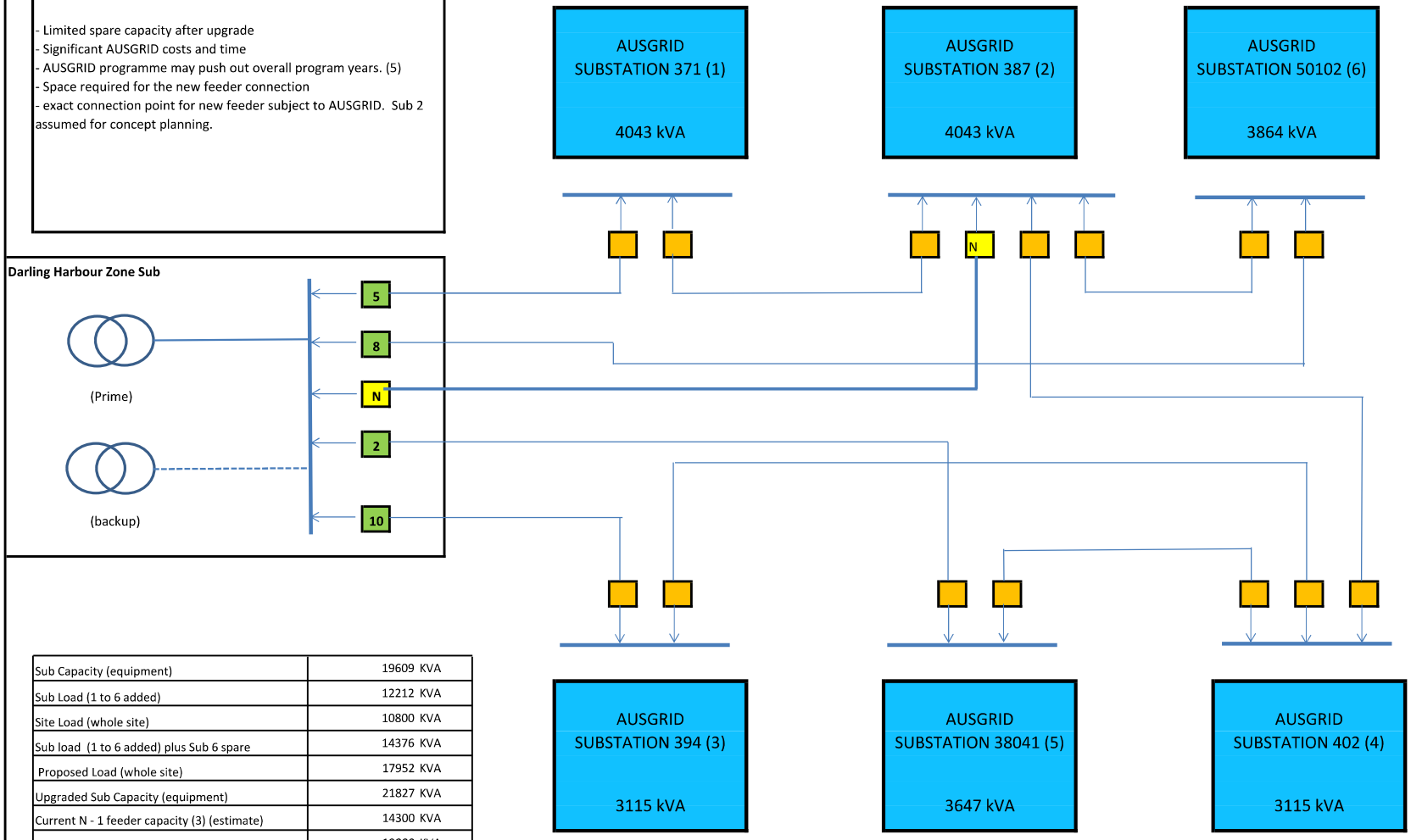


Sub Capacity (equipment)	19609 KVA
Sub Load (1 to 6 Added)	12212 KVA
Site Load (whole site)	10800 KVA
Sub load plus Sub 6 spare	14376 KVA
Current N - 1 feeder capacity (4) (estimate)	14300 KVA

OPTION 1 : AUSGRID NETWORK DARLING HARBOUR SUB UPGRADE

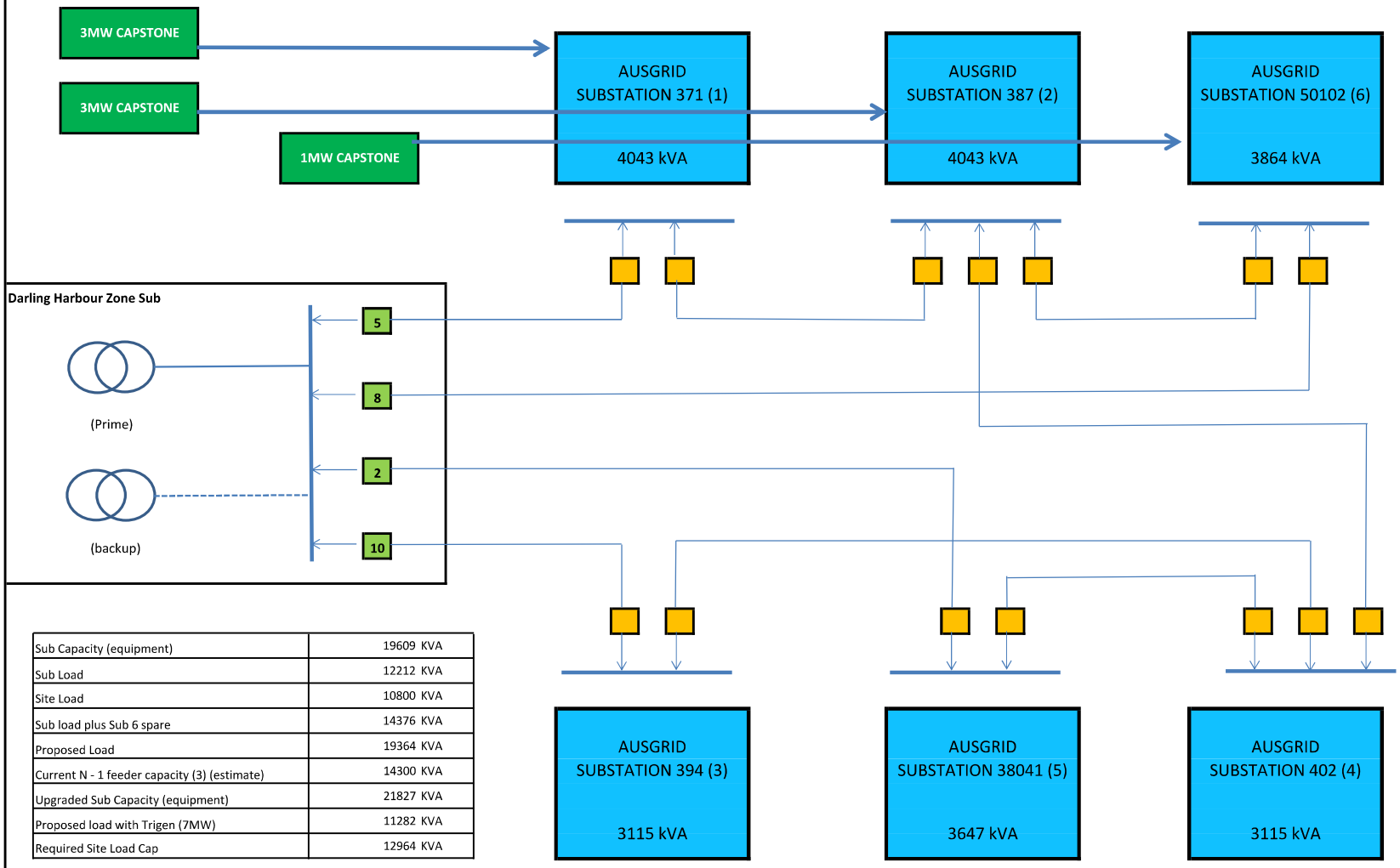
Issues:

- Limited spare capacity after upgrade
- Significant AUSGRID costs and time
- AUSGRID programme may push out overall program years. (5)
- Space required for the new feeder connection
- exact connection point for new feeder subject to AUSGRID. Sub 2 assumed for concept planning.



Sub Capacity (equipment)	19609 KVA
Sub Load (1 to 6 added)	12212 KVA
Site Load (whole site)	10800 KVA
Sub load (1 to 6 added) plus Sub 6 spare	14376 KVA
Proposed Load (whole site)	17952 KVA
Upgraded Sub Capacity (equipment)	21827 KVA
Current N - 1 feeder capacity (3) (estimate)	14300 KVA
Proposed N - 1 feeder capacity (4) (estimate)	19000 KVA

OPTION 2 : TRIGENERATION CONNECTED AT LOW VOLTAGE



Sub Capacity (equipment)	19609 KVA
Sub Load	12212 KVA
Site Load	10800 KVA
Sub load plus Sub 6 spare	14376 KVA
Proposed Load	19364 KVA
Current N - 1 feeder capacity (3) (estimate)	14300 KVA
Upgraded Sub Capacity (equipment)	21827 KVA
Proposed load with Trigen (7MW)	11282 KVA
Required Site Load Cap	12964 KVA

Issues:

- do we remove all diesels and use the standby circuits ass the connection pathway

- control system for prime and standby operation may be complex if turbines are combinjed with diesesl for standby operation.

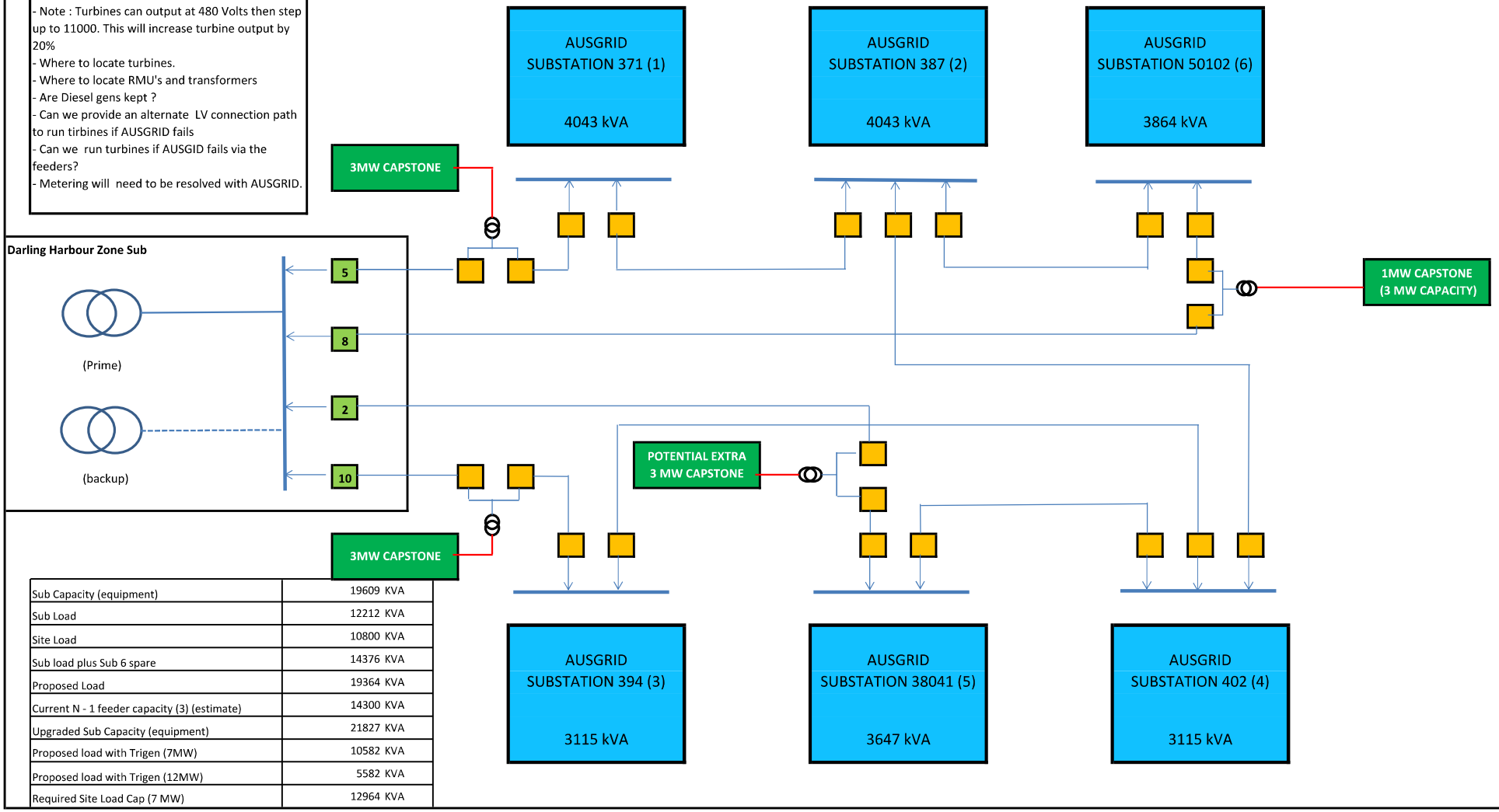
- do we install in the existing dlesel plantroom.

-AUSGRID have no spare fault headroom to allow trigen to connect at 400 Volt. This may kills this option.

-AUSGRID whole of site cap needs to be 12.9 MVA for the 7MW option to work.

OPTION 3 : TRIGENERATION CONNECTED AT 11 KV

Issues:
- Note : Turbines can output at 480 Volts then step up to 11000. This will increase turbine output by 20%
- Where to locate turbines.
- Where to locate RMU's and transformers
- Are Diesel gens kept ?
- Can we provide an alternate LV connection path to run tirbines if AUSGRID fails
- Can we run turbines if AUSGID fails via the feeders?
- Metering will need to be resolved with AUSGRID.



Sub Capacity (equipment)	19609 KVA
Sub Load	12212 KVA
Site Load	10800 KVA
Sub load plus Sub 6 spare	14376 KVA
Proposed Load	19364 KVA
Current N - 1 feeder capacity (3) (estimate)	14300 KVA
Upgraded Sub Capacity (equipment)	21827 KVA
Proposed load with Trigen (7MW)	10582 KVA
Proposed load with Trigen (12MW)	5582 KVA
Required Site Load Cap (7 MW)	12964 KVA

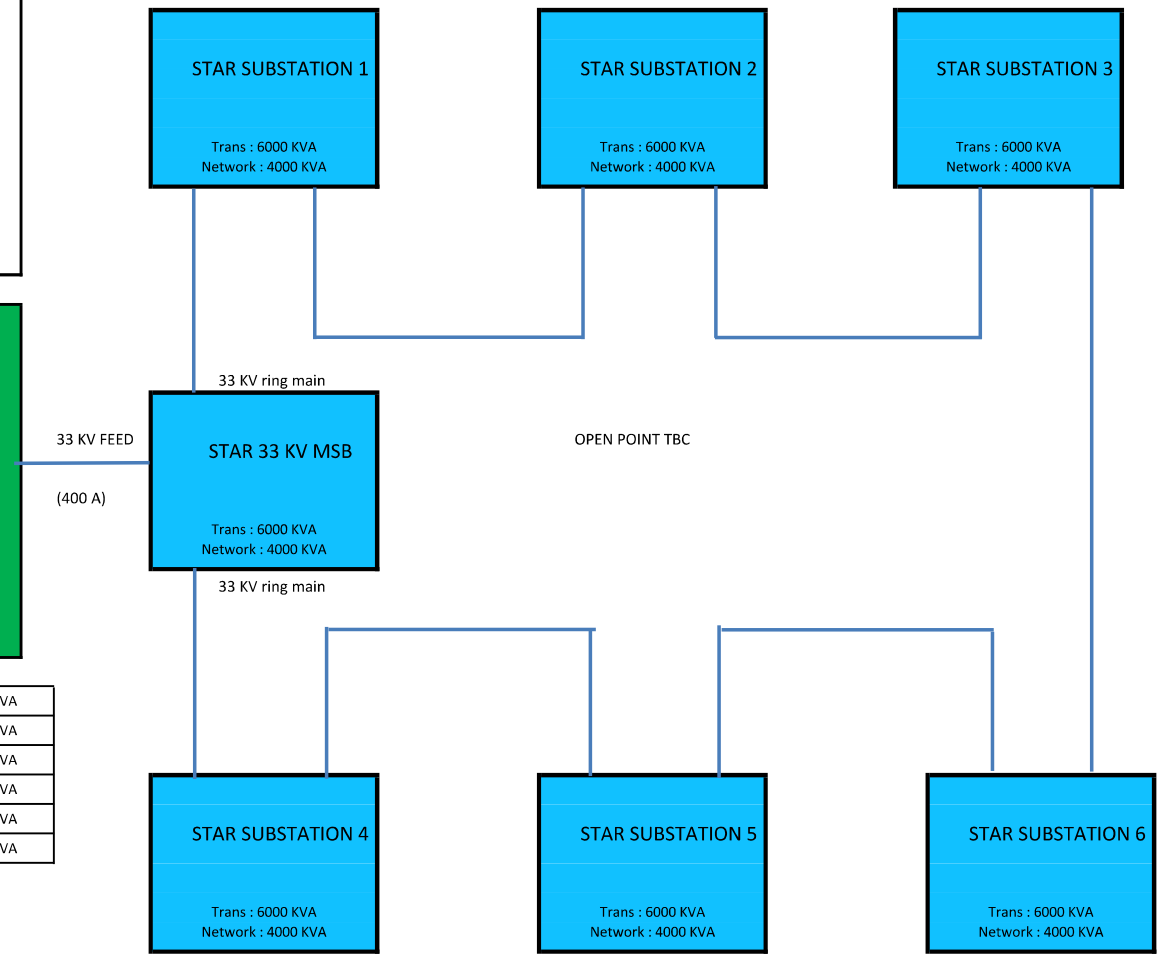
OPTION 4 : NEW AUSGRIED DEDICATED 33 KV SUPPLY TO SITE

Issues:

- Staging to conduct the changeover from AUSGRID to private
- the changeover may be far too disruptive.
- where to run the 33 KV service
- Where to install a new 33 KV switchroom.
- Best HV design to interface with existing LV.
- Service capacity TBC. 400 A = 22 MW

AUSGRID PYRMONT 33 KV SUB TRANSMISSION SUBSTATION

Existing Sub Capacity (400 V service)	19609	KVA
Sub Load (1 to 6 added)	12212	KVA
Site Load (whole site)	10800	KVA
Proposed Sub Capacity (33 KV service)	36000	KVA
Proposed Load (whole site)	17952	KVA
33 KV Feeder capacity	21827	KVA



APPENDIX B – AUSGRID RESPONSE & REVISED APPLICATION

Connection Application - Large, Multiple and Remote Connections

FORM NECF-03

Ausgrid

Who should use this form

Use this form if you:

- require a new or altered service connection greater than 100 Amps **OR**
- require new infrastructure to provide electricity to a subdivision of land **OR**
- require a new or altered connection at high voltage **OR**
- require a new or altered service connection at 100 Amps **WHERE**
  - the development comprises more than 6 separate units **OR**
  - any item of plant or equipment is rated at 30 amps or more

For other connections use NECF-02 Connection Application - Residential and Small Commercial Connection

General enquiries

More information on completing this form can be found on our website:
www.ausgrid.com.au/connectingtothenetwork

Fields marked with an * are mandatory.
This form is to be completed using BLOCK LETTERS only
Any application marked TBA or TBD will be incomplete and will be returned with advice that Ausgrid will not be able to process the application until a complete application is re-submitted. If you do not have all the required information at this stage and are only interested in determining how your proposed development will be supplied, you should consider lodging a preliminary connection enquiry, using our form NECF-01.

How to submit this form to Ausgrid

Sydney, Central Coast and Hunter
Fax: (02) 4399 8007
Fax (local call): 1300 662 089
Email to: datanorth@ausgrid.com.au

Upper Hunter only
Fax: (02) 6542 9037
Email to: datamuswellbrook@ausgrid.com.au

Total number of pages sent* 2 3

PART A: PREMISES AND DEVELOPMENT DETAILS

1. Premises and Owner Details

Retailer: ORIGIN ENERGY
NMI: 4103624752 ◄ Your NMI can be found on your electricity bill. Put NA for a new site.
Property Name: THE STAR
Floor No.:
Unit No.:
Street No. or RMB*: 80 or
Lot No.*:
DP No.*:
Street Name*: PYRMONT STREET
Post Code*: 2009
Suburb*: PYRMONT
Nearest Cross Street: UNION STREET
Name of Registered Proprietor of Land*: THE STAR ◄ This is the person authorising connection of the premises.
Address of Registered Proprietor of Land*: 80 PYRMONT STREET
Post Code*: 2009

2. Retail Customer or Real Estate Developer Details

Tick here if you are the land owner ✓ Now proceed to Section 3

Title, First Name, Last Name*: SCOTT HARRISON
ABN *(if applicable)*: 25 060 510 410
Company Name *(if applicable and provide representative details above)*: THE STAR
Phone No.:
Postal Address *: 80 PYRMONT STREET
Mobile Phone No.: 0408 775 199
Email Address*: SCOTT.HARRISON@STAR.COM.AU
Fax No.:

3. About You - The Connection Applicant

Questions in this section are about the person making this Connection Application.

What type of applicant are you?* (write A, B, C, D,E or F): F

A = Retail Customer,
B = Real Estate Developer
C = Energy Retailer
D = You are applying on behalf of a retail customer or developer
E = Electrical Contractor on behalf of a customer or developer
F = ASP on behalf of a customer or developer

Title, First Name, Last Name*: MARC PIROZZI
ABN *(if applicable)*: 48 050 056 712
Company Name *(if applicable and provide representative details above)*: WEBB AUSTRALIA GROUP
Phone No. * (and/or): 02 9418 1444
Postal Address *: LEVEL 4 828 PACIFIC HIGHWAY GORDON NSW 2072
Mobile Phone No.*: 0402 141 103
Email address*: MPIROZZI@WEBBAUSTRALIA.COM.AU
Fax No.:

Electrical Contractor Licence No.* *(If **E** above)*:
ASP No.* *(If **F** Above)*: and/or 1685
Level: 3 ◄ If you are an ASP you must provide your accreditation number and level (1,2,3)

Street Address of the Premises *(to be completed by applicant)* * | Post Code*

80 PYRMONT STREET PYRMONT | 2009

4. Electrical Contractor Details *(if available)*

Tick here if the same as Section 3 above ☐ Now proceed to Section 5

Title | First Name and Last Name *(or Company Name)* | ABN *(if applicable)*

Postal Address | Phone No.

Email | Fax No.

Electrical Contractor Licence No.

PART B: LOAD DETAILS

5. Connection Details

(i) Connection Timeframes

(a) When do you expect the construction of the premises connection assets to commence?* 01 / 03 / 2018

(b) When do you wish to energise (ie turn on the supply to) the premises?* 01 / 11 / 2018

▲

Premises connection assets are the components of the distribution system used to provide the connection service to the premises eg service cable, metering, new Ausgrid pole, pillar or substation etc.

(ii) Existing Connection *(if applicable)*

Existing Point of Common Coupling: Pole ☐ Pillar ☐ Substation ☑

Asset No.: S.371 S.387 S.394 S.402 S.36041 S.50102 ◄ This is the No. of the pole, pillar or substation. If there is no asset No. put "unknown".

Meter No.

If you have an existing supply, is it from a substation located on the premises?* Y ☑ N ☐

(iii) Infrastructure to a Land Subdivision

(a) Is this an application to provide infrastructure to a land subdivision, eg provide low voltage reticulation within an URD subdivision ?* Y ☐ N ☑ ► If No, proceed to (iv) below otherwise continue on to (b) below

(b) No. of lots in the subdivision*

(c) Nearest existing Ausgrid Asset*

Pole ☐ Pillar ☐ Substation ☐ Asset No. ◄ This is the number of the pole, pillar or substation. If there is no asset number put "unknown".

► Proceed to (vi)

(iv) Proposed Point of Common Coupling * *(Please tick one)*

Pole ☐ Pillar ☐ Substation ☑ Asset No. S.371 ◄ This is the number of the pole, pillar or substation. If there is no asset number put "unknown".

Is the Point of Common Coupling within 50m of the boundary of your land?* Y ☑ N ☐

(v) Proposed Connection Point* *(Please tick one or if Other, please describe)*

Private Pole / Pit / Pillar ☐ Main Switchboard ☐ Front of Premises ☐ Other EXISTING SUBSTATIONS

(vi) Connection Type* *(Please tick all that apply)*

New ☐ Upgrade ☑ Alteration ☑ Separation ☐ Amalgamation ☐

(vii) Embedded Generation Details* *(e.g. solar, wind, hydro, back-up and standby)*

(a) Does the premises have existing embedded generation?* Y ☐ N ☑ ► If Yes Rated Output kW Type: (solar, wind, gas, etc)

(b) Are you upgrading or installing new embedded generation?* Y ☐ N ☑ ► If Yes, submit our NECF-04 form in addition to this form

(c) Your Installer's Clean Energy Council Accreditation No. ◄ Only complete if embedded generation comprising of AS/NZS 4777 compliant components is being installed

Street Address of the Premises *(to be completed by applicant)* * | Post Code*

80 PYRMONT STREET PYRMONT | 2009

(viii) Service Type* *(Please tick one)*
Overhead ☐ Underground ☑ UGOH ☐ Off Pole Transformer ☐ Busbar Supply ☐

(ix) Service Size* *(Please tick one)*
100 Amps ☐ 200 Amps ☐ 400 Amps ☐ 630 Amps ☐ 800 Amps ☐ 1000 Amps ☐
1200 Amps ☐ 1600 Amps ☐ 2000 Amps ☐ 2500 Amps ☐ 3000 Amps ☐
Other ☑ Describe Existing Substation Supplies
(Complete if Other is ticked, eg high voltage connection at 11KV)

(x) Number of Phases* *(Please tick one)*
1 Phase ☐ 2 Phases ☐ 3 Phases ☑

(xi) Metering Details*
(a) Are new meters being installed as part of this connection application?* Y ☐ N ☑ ► If yes, number of meters in (b) below must be completed

(b) Number of Meters: *(enter total number)*
Single Phase (E1) ☐ Three Phase (E3) ☐ Single Phase & Controlled Load(E2) ☐ Tariff: Controlled Load 1 ☐ Controlled Load 2 ☐

(c) Embedded generation metering: *(tick if applicable or describe)*
Net ☐ Gross ☐ Other ☐

(d) Will your installation be CT metered?* Y ☐ N ☐ ► If yes, *CT Metering Form* must be submitted. Refer to that form for submission details

(xii) Type and Number of Premises

Land Title Type* *(Please tick one)*	Premises Usage* *(Please tick one or more)*	No. of Premises* *(enter total number)*
Torrens ☑	Residential ☐	
Strata ☐	Commercial / Industrial ☑	1
Community Title ☐	House Services ☐	
	Builder's Service ☐	

Which of the following applies to your premises?* *(one must be ticked)*
Urban ☑ Unknown ☐ Rural ☐
◄ Only fill out House Services if you have Multiple Installations

(xiii) Calculated Maximum Demand in Each Phase (Amps) ◄ This question is not asking about service rating.

	A	B	C			
(a) Existing Maximum Demand	17,700	17,700	17,700	Amps	Existing Service Length	Existing m
(b) Proposed Maximum Demand * *(Total of New & Existing Load)*	29,000	29,000	29,000	Amps	Proposed Service Length*	Existing m

(c) Is a Maximum Demand Calculation worksheet attached to this application?* Y ☑ N ☐ ◄ A worksheet showing the maximum demand calculation in accordance with AS/NZS3000 must be attached to this form unless you answered "Y" in (iii)(a) above.

6. Additional Development Details *(please fill in where relevant to your premises)*

If your development involves any of these, this section MUST be completed, even if you are providing your plans with this application

Residential Portion
Number of living units
Number of bedrooms per unit
Gas hot water *(yes/no)*
Gas cooktop *(yes/no)*
Car park ventilation current rating Amps
Car park area requiring lighting m^2
Air conditioning *(yes/no & if Yes, No. of units)*
Air conditioning rating *(Electrical Input)* Amps

Industrial Portion
No of factory units
Total floor area of all factory units m^2

Commercial Portion
Number of shops
Total floor area with air conditioning m^2
Total office area without air conditioning m^2
Car park ventilation current rating Amps
Car park area requiring lighting m^2
Warehouse floor area m^2
Commercial areas for food handling *(yes/no)*

Other (eg Lifts, Cranes,etc - List Type, No & Rating in Amps)
Existing

Street Address of the Premises *(to be completed by applicant)* *

8 0 PYRMONT STREET PYRMONT

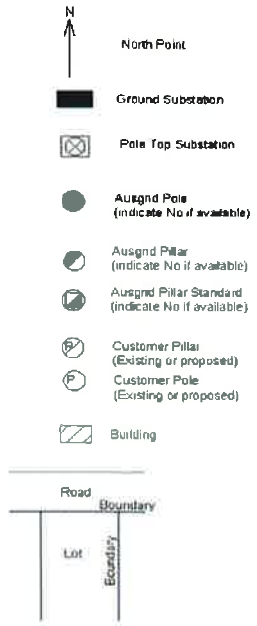
Post Code* 2009

7. Location Diagram*

This section is about the physical location of your premises and an electrical schematic will not be accepted. Ensure that your diagram clearly identifies property, nearest cross street, North Point, Proposed Point of Common Coupling, Point of Supply and service cable route to main switchboard. Attach a separate paper if more space is required.

See attached Location Diagram

Use the following symbols where necessary:



8. Specific Equipment - Non Linear/Fluctuating Load Details *(complete if installing any of the items listed below)*

This section is for connections where (a) any single item of plant or equipment has a rating > 75 Amps at 230/400V, (b) any HV connections, or (c) Work where the proposed equipment may cause excessive fluctuations of voltage (eg. lifts,welders, pumps, x-ray machines).

Description	kVA/kW	Amp	No of Ops/Hr	Design Standard	Mitigation Measures
Distorting Loads					
1 Phase capacitor-filtered or conventional rectifier					
3 Phase 6-pulse capacitor filtered rectifier / VSD					
3 Phase 6 pulse capacitor filtered rectifier with series inductor > 3% or DC drive / VSD					
3 Phase 6 pulse inductor filtered rectifier / VSD					
3 Phase 12 pulse rectifier / VSD					
AC voltage regulator					
Variable voltage variable frequency (VVVF) drive					
Switch mode power supplies					
Power Factor Correction					
Other (please specify)					
Fluctuating Loads					
Rating of the largest motor					
Rating of the second largest motor					
Rating of other frequently fluctuating loads:					
Other:					
Special Equipment					
X-Ray or Magnetic Resonance Imaging Devices					
Welding plant rating					
Arc furnaces rating					
Unbalanced loads *(e.g PH-N / PH-PH loads)*					
Other, (incl >75A rated equipment):					
TOTAL APPARENT POWER RATING *(KVA)*					

Street Address of the Premises *(to be completed by applicant)* * | Post Code*

80 PYRMONT STREET PYRMONT | 2009

9. Expedited Connection *(optional)*

For information regarding this section please refer to our website or the guide for this form.

Are you applying for an expedited connection? Y ☐ N ☑ ▶ If No, proceed to Section 10

If Yes, then indicate which model standing offer to provide connection services is acceptable to you (you may tick more than one).

- ☐ Basic - 100 Amps connection
- ☐ Basic - Over 100 Amps connection
- ☐ Basic - micro EG connection
- ☐ Standard - connection requiring Ausgrid-funded offsite works
- ☐ Standard - connection requiring Ausgrid-funded onsite substation
- ☐ Standard - ASP/1 connection
- ☐ Standard - connection requiring Ausgrid augmentation (substation upgrade)

10. Other Information

Information you provide in this section may help Ausgrid to process your connection application faster.

Was a Preliminary Connection Enquiry lodged for the premises using our form NECF-01? Y ☐ N ☑ — Preliminary Enquiry No.

Has Ausgrid provided a certified design number for a Network Augmentation project associated with the premises? Y ☐ N ☑ — Certified Design No.

If you have appointed an ASP/1, please provide their details below otherwise skip to next question

ASP/1 Name | ASP No.

Do you have development consent for your proposal? Y ☑ N ☐ — DA Reference No. MP08_0098MOD14

▲

If yes, please attach any conditions relating to electricity where not already provided to Ausgrid.

Do you wish to underground/relocate electricity assets in conjunction with this connection application? Y ☐ N ☑ ▶ If yes, please provide details in section 11, or on a separate paper

11. Comments and Additional Information *(if applicable)*

(e.g. References to similar existing installations, supporting information. Attach information on a separate paper if there is insufficient space below)

The supply capacity to The Star will be required to be upgraded from its current limitation of 12.2MVA by an additional 7MVA.

Based on Ausgrid System Planning Advice of 26th June 2017, we are seeking to proceed with Option 2 - new 11kV feeders from Darling Harbour zone substation ZN88 and upstream 11kV network augmentation.

As the entire increase will not be required immediately, the following multi stage approach is proposed:

Stage 1: 2 new 11kV feeders to be established from ZN88 (2 panels) which will be used to augment the existing 11kV arrangement.

This is expected to be completed by November 2018 before the Dec 2018 / Jan 2019 summer peak load.

Stage 1: Load increase of 2MVA by November 2018

Stage 2: Load increase of another 2MVA by November 2019.

Stage 3 will be future works. This involves a new hotel, a new substation and an additional load increase of 3.8MVA by Nov 2020 / Mar

The proposed arrangement for the existing 11kV feeder augmentation and the addition of the two (2) the new 11kV feeders is shown on the Webb Increase Capacity Requirement Proposal attached.

Note: Existing Substations No.1 (S.371), No.2 (S.387) and No.5 (S.36041) are being planned for OAFD protection upgrades to increase available substation capacity as separate parallel projects.

Street Address of the Premises *(to be completed by applicant)* *

80 PYRMONT STREET PYRMONT

Post Code*

2009

12. Signatory

Signatory should be the person named in Section 3, ie the *Connection Applicant*.

Where this application requests an expedited connection, I declare that I have read and understood the terms and conditions of the connection offer referred to in section 9 (including the Connection Offer Summary) and agree that if the connection is expedited that a contract based on that offer will be formed with Ausgrid on the date that Ausgrid receives the application.

Where this application is being made on behalf of a retail customer or real estate developer, I declare that I have obtained the authority of that person to make this application of their behalf, including where applicable, making a request for expedition of the connection application.

Signatory Name*

MARC PIROZZI

Signatory Position*

DIRECTOR

Signature of Connection Applicant*

Date signed by the Connection Applicant*

09 / 01 / 2018

Attachment Checklist:		Tick if done	No of pages	Remarks
This Connection Application form		✓	6	Ensure all fields marked with * are filled in
AS/NZS3000 maximum demand worksheet		✓	1	Refer to question 5(xiii)(c)
Connection Application for Embedded & Standby Generation Form NECF-04				Required if you answered "Y' in question 5(vii)(b)
Development Plans				Attach if available
Location Diagram (if space in Section 7 is inadequate)		✓	1	
Conditions of consent to your Development Application		✓	2	Refer to Section 10
Other (please specify)	Ausgrid System Planning Advice	✓	9	
Other (please specify)	Webb Increase Capacity Proposal	✓	4	
		TOTAL*	23	

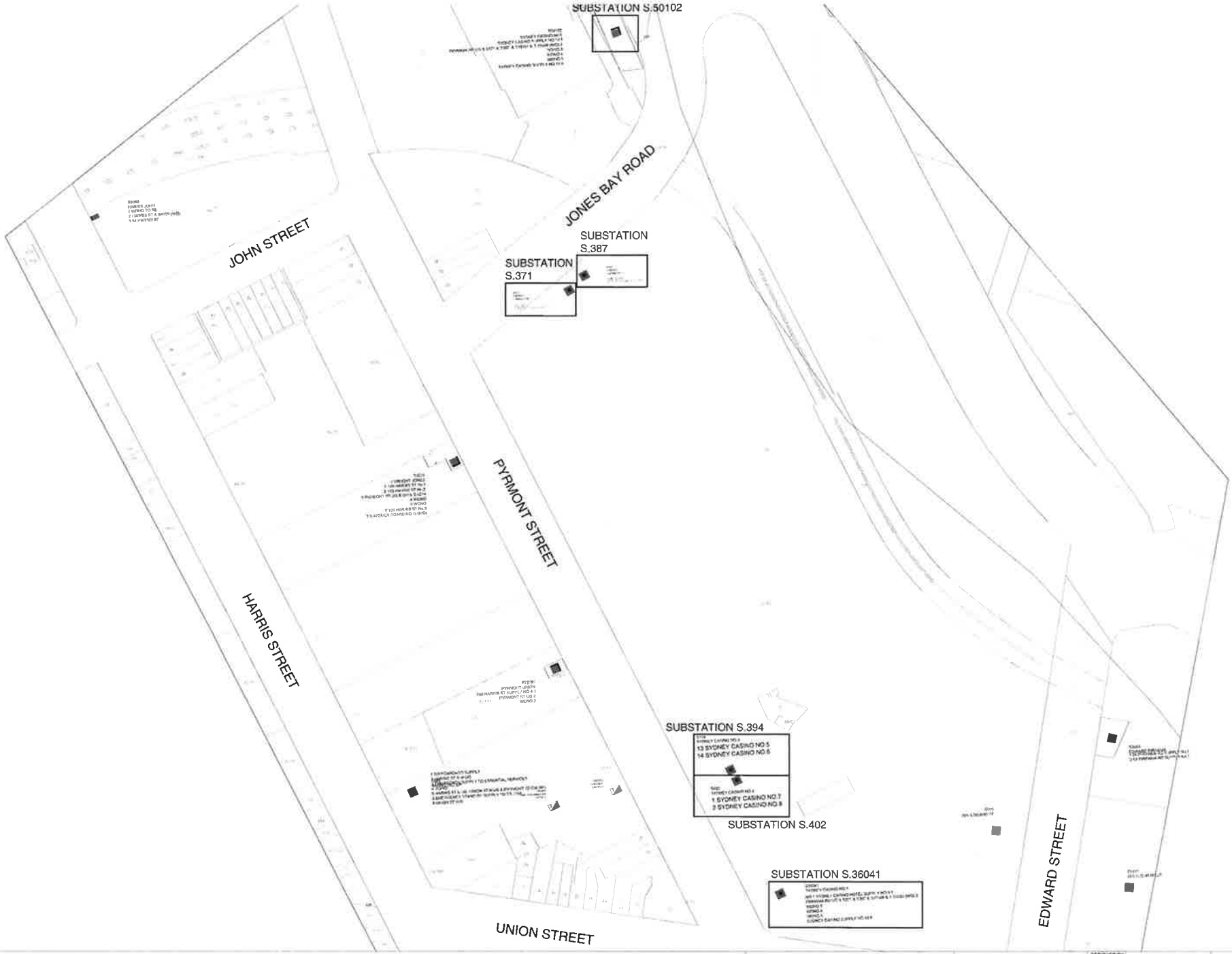
If this application is incomplete in a material respect or if Ausgrid requires more information, Ausgrid will not process the application until you provide the relevant information. If you do not supply the requested information within 12 months, this application will lapse.

The Star Casino Increase in Maximum Demand

Existing Maximum Capacity	12.2MVA	17,700 Amps
Stage 1 Increase Approximately Nov 2018 Approximate Description • Sovereign Room Expansion Stg 1 =.6MVA • Sovereign Room New Food and Beverage =.2MVA • Sovereign Room New Chiller and Pumps etc. =1.1MVA • Astral Lobby Expansion = .1MVA	2MVA	2,900 Amps
Stage 2 Increase Approximately Nov 2019 Approximate Description • Sovereign Room Expansion Stg 2 =.3MVA • New Sea Water Plant, Chiller and Pumps etc. = 1.5MVA • BAU, Data Hall, and General Upgrades = .2MVA	2MVA	2,900 Amps
Total New Maximum Demand on existing six substations	**16.2MVA**	**23,500 Amps**

Future New Hotel

Stage 3 Future Increase Approximately Nov 2020 / 21 New Substation Required for New Hotel Development = 3.1MVA	3.1MVA	4,500 Amps
Retail Area Expansion for New Hotel area load on to existing site = .7MVA	.7MVA	1,000 Amps
Total New Maximum Demand on existing six substations and new substation	**20MVA**	**29,000 Amps**



Replace this text in Block MY_LOGO with Company Logo and Company Address, Phone and Project Details.

DESIGNED BY:
AUTH NO
SUBMIT DATE — SUBMITTED
LGA — LOCATION DIAGRAM
MAP REF — USD or STREET DIR. REF.
AUSGRID REF — AUSGRID MAP REF.
PRJTRAK No.

ASP REF. — ASP Quality File Reference

ASSOCIATED DRAWINGS — CERTIFICATION NUMBER — # # / # #

LOCATION DIAGRAM

Modification of Minister's Approval

Section 75W of the *Environmental Planning and Assessment Act 1979*

As delegate of the Minister for Planning, under the delegation dated 16 February 2015, I approve the modification of this project application referred to in Schedule 1, subject to the conditions outlined in Schedule 2, the schedule of minor works at Schedule 3 and the Statement of Commitments at Schedule 4.

Sargeant

Anthea Sargeant
Executive Director
Key Sites and Industry Assessments

Sydney 4 October 2017

SCHEDULE 1

Application No:	MP 08_0098
Proponent:	Star Entertainment Group Ltd (SEGL)
Approval Authority:	Minister for Planning
Land:	20-80 Pyrmont Road, Pyrmont (Lot 500 DP 1161507, Lots 301 and 302 DP873212, Lot 211 DP870336, Lot 201 DP867855 and Lot 1 DP 867854)
Project:	Construction of a new hotel and podium level extension on the Switching Station site and alterations and additions to the existing casino building.
Modification:	**MP 08_0098 MOD 14**: • **Development works** including; an expansion in gaming floor area, enclosing the level 3 terrace, enclosing the level 3 pre-function centre, changes to the Astral Hotel lobby and retail space, reversion of business centre in Astral Hotel to hotel rooms, internal alterations to the Sydney Electric Lighting Building (SELS), upgrades to internal vertical transportation, services and infrastructure. • **Consolidation of development consents** including consolidating of existing gaming related development consents. • **Amendments to conditions** o update references to plans and documents (Condition A2); o provide flexibility for minor works and relocation of GFA (Condition A3A); o update development contributions (Conditions B12 B13);

- provide for the temporary removal of trees (Condition B23);
- allow for 24 hour internal works (Condition D11);
- provide for landscaping and public domain works (Condition B9A and B30);
- rationalise operational requirements for noise management (Conditions F1 – F6); and
- incorporate relevant operational conditions from consolidated consents (Conditions F10 - F18).

Address all relevant correspondence to:
Major Customer Connections
PO Box 4009
Sydney NSW 2001

F: + 61 2 9700 5621
E: majorconnections@ausgrid.com.au

26 June 2017

Peter Reedy
Senior Associate

Umow Lai
L7, 657 Pacific Highway
St Leonards NSW 2065

peter.reedy@umowlai.com.au

Dear Peter,

MC16028 / SC09203 – The Star Casino 80 Pyrmont St Pyrmont - Load Increase - System Planning Advice

Further to the connection enquiry and email from Umow Lai dated 29 September 2016 and subsequent discussions, our System Planning group have completed a review of connection options and related network requirements to support the load increase at Star Casino.

The existing Star Casino load is currently supplied via six (6) distribution substations which are supplied by existing 11kV feeders from Darling Harbour zone substation. The Star Casino is requesting an additional load of 7MVA in addition to their existing site load of approximately 12MVA.

The key outcomes from this review are described below and will provide important information regarding network supply options for the load increase. The permanent supply is nominally required by the end of 2018.

A range of connection options have been considered and compared based on overall cost as well as general technical suitability and integration with our own network development plans for the area. Through this process the options have been narrowed down to two key options available for further consideration:

1. New 33kV feeders from Pyrmont STS
2. New 11kV feeders from Darling Harbour zone substation and upstream 11kV network augmentation

Connection Option 1 – New 33kV feeders from Pyrmont STS

1.1 Project Details and Other Considerations

This option provides a permanent 33kV supply option from Pyrmont STS to cater for The Star Casino's total site load of 19MVA (inclusive of the required additional load of 7MVA).

There are various options to cater for a permanent 33kV N-1 supply from Pyrmont STS. Such options involve rearranging the Star Casino's private and/or internal electrical reticulation to

ensure it is adequate for a 33kV incoming supply from the Ausgrid network. The following options could be considered by Star Casino to cater for an incoming 33kV N-1 supply:

- The installation of a new private 33/11kV substation to allow for internal reticulation at 11kV (make provision for supply via private 11kV/400V substations similar to the existing on-site arrangement).
- The installation of a new private 33kV switchroom to allow for internal reticulation at 33kV (make provision for supply via private 33kV/400V substations).
- The installation of a new private 33kV switchroom to allow for internal reticulation at 33kV (make provision for supply via private 33/11kV substations).

Option 1 provides a common supply side and/or network solution to support these various options to take an incoming N-1 supply at 33kV from the Ausgrid network as described above. This option involves the construction of new 33kV feeders from Pyrmont STS to the proposed Star Casino's private 33/11kV substation or 33kV switchroom within the premises of Star Casino. There are adequate spare 33kV circuit breakers at Pyrmont STS to connect this new customer.

This option assumes a new private 33kV switchroom or substation will be located near the existing Star Casino distribution substations along Jones Bay Rd. Two (2) new 33kV feeders will need to be connected between the existing 33kV switchgear at Pyrmont STS and then exit and traverse North on Pyrmont St to the proposed private 33kV switchroom or substation. This will require the installation of approximately 250m of 3 Core Cu XLPE cable per feeder.

The proposed cable route is expected to traverse through a very congested area due to existing and proposed cables and other existing services within the vicinity of Pyrmont STS, Pyrmont St and Jones Bay Rd.

Ausgrid is facilitating multiple connection projects from Pyrmont STS and it is evident that significant design and construction challenges exist due to existing Ausgrid assets, other services and physical structures in the area. Specific attention is required during design and construction phases to prevent compromising the thermal capacity ratings of all existing and future assets in the area.

A detailed cable route and rating study will be required. A ratings review should be completed in conjunction with all other projects within the area to ensure thermal capacity ratings of all existing and proposed assets are not compromised.

It is also anticipated that non-electrical services and physical structures also exist that can contribute to physical congestion issues in the area (e.g. sewer, water mains, gas, communications). This can potentially result to a high level of complexity and/or difficulty during construction works.

A detailed investigation should be carried out to determine the practicality and or feasibility of this option.

This option may require the decommissioning of existing Ausgrid distribution assets within the premises of Star Casino. All risks associated with the decommissioning of existing Ausgrid assets which may include the transfer of ownership and maintenance should be evaluated and investigated further. A risk assessment that covers all aspects (e.g. financial, safety, legal, maintenance, asset ownership, etc) should be carried out in relation to the management of the existing distribution assets on site, the installation of new equipment and/or modification of existing equipment on Star Casino's private electrical network to ensure they are adequate for 33kV supply.

The impact on fault level and voltage regulation should also be evaluated when considering this option and when selecting new equipment and/or modifying existing equipment on Star Casino's private electrical network.

An indicative 33kV feeder route for option 1 is shown in Figure 1 below.

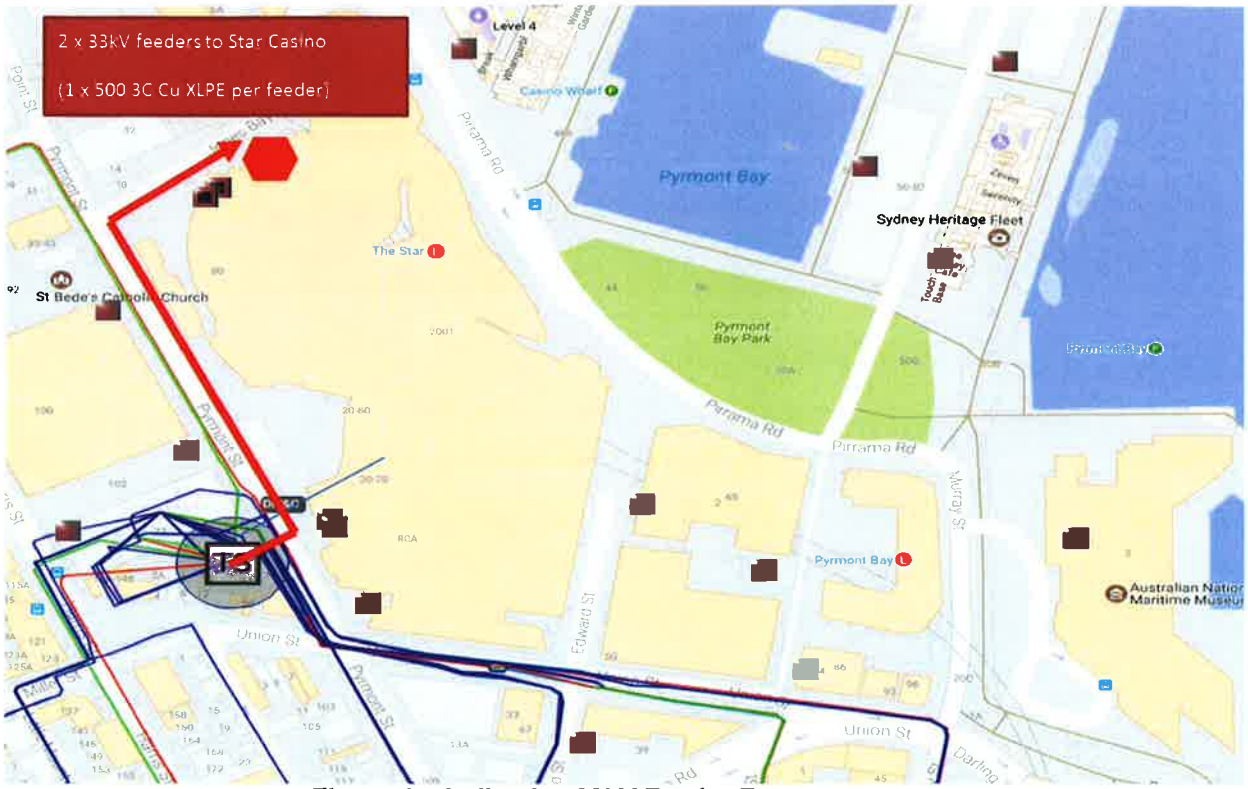


Figure 1 – Indicative 33kV Feeder Route

The proposed single line diagram for option 1 is shown in Figure 2 below.

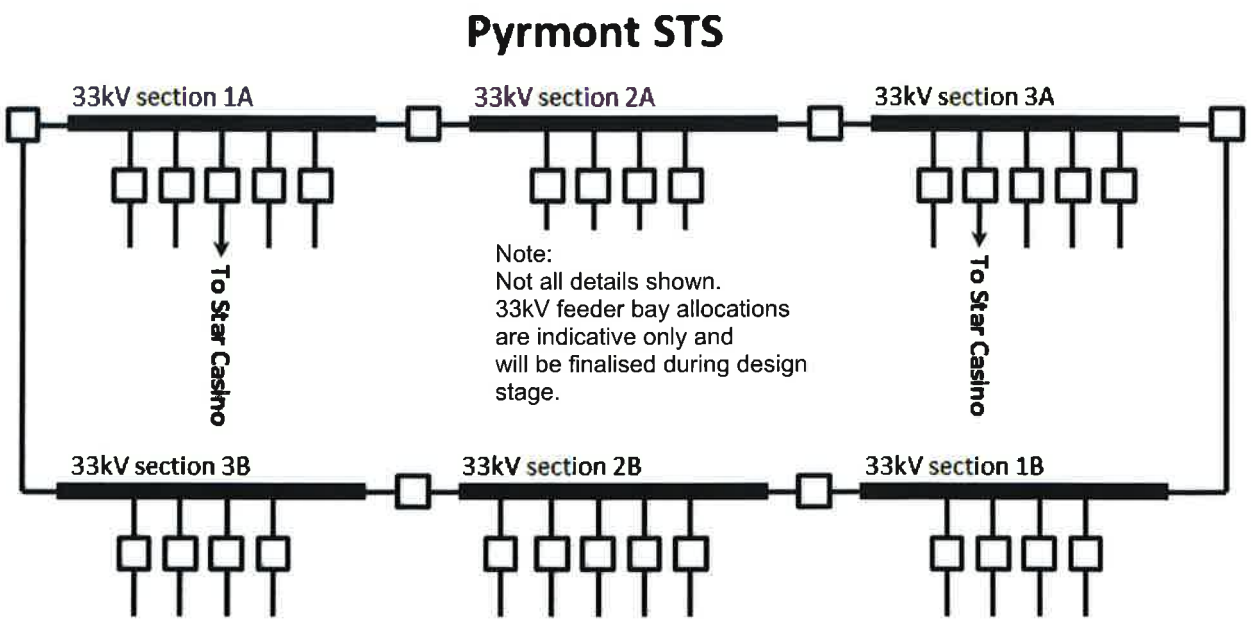


Figure 2 – Pyrmont STS 33kV Single Line Diagram

1.2 Fault Levels

Estimated indicative fault levels (voltage factor – 1.1) at Pyrmont STS in 2017 and 2020 are as follows:

	Fault Level (kA)			
	3Φ Fault	2Φ - G Fault		1Φ - G Fault
		Φ - Φ	Earth	
Pyrmont STS Existing – 33kV Busbar[1]	18.98	17.22	1.57	3.10
Pyrmont STS Ultimate – 33kV Busbar[2]	23.29	20.95	1.57	3.11

Note: 33kV fault level is calculated based on system NORMAL network configuration.

All 33kV equipment installed as part of this project should have a fault duty of at least 31.5kA for 3.0 sec, to align with Ausgrid's current standard contract specification.

1.3 Operational Details

All supplies to Star Casino's permanent supply will be run normally closed at Pyrmont STS and are to be supplied from separate bus sections at Pyrmont STS.

The 33kV feeders should not be paralleled at the Star Casino end as it imposes limitations on Ausgrid's ability to operate the upstream network. Relevant customer circuit breaker status signals should be returned to Ausgrid's SCADA system.

1.4 Communications

Appropriate fibre-optic communication links should be installed between Pyrmont STS and Star Casino as required for control, protection and communications. Additional communication pits may be required along the proposed route.

Allowance should be made for any installation/upgrades to SCADA equipment at both Pyrmont STS and Star Casino substations.

1.5 Metering

Changes to the connection arrangement may require that any revenue metering is upgraded to comply with the current version of the NSW Service and Installations Rules, NS195, the National Electricity Rules and AEMO Metrology procedures.

An appropriate metering installation must be installed at the customer's premises and as close as practicable to the agreed Connection Point as per Ausgrid Electrical Supply Standard ES3 Part A.

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1 Calculated fault level is based on three transformers at Pyrmont STS with two transformers in service and one transformer (TX3) on standby in 2017.

2 Calculated fault level is based on four transformers at Pyrmont STS with three transformers in service and one transformer (TX3) on standby in 2020.

1.6 Protection

The requirement for the protection system will be installed as per relevant Ausgrid Standards. New optical fibre may need to be installed as required in Section 1.4

The design of the customer end of the feeder should not allow interconnection with any other source of supply (whether from Ausgrid or elsewhere) without prior agreement.

1.7 Land Requirements (Easements, Acquisitions, Disposals)

It is assumed that underground cable installation for most of the route will be via public roadways. The new private substation or 33kV switchroom is anticipated to be installed within the existing premises of Star Casino.

Any easement requirements are to be determined by further route investigations and negotiated/secured as part of the projects development in coordination with Ausgrid.

1.8 Cost Estimates

The cost estimate based on approximate Ausgrid standard costs (in 2017/18 dollars) for an assumed final arrangement and required works is given below:

Option 1A		
Dedicated Connection Assets	**Need Date**	**Cost Estimate Range ($M)**
Construction of two 33kV U/G feeders from Pyrmont STS to Star Casino 33/11kV substation or 33kV switchroom in Jones Bay Rd (nominal 2 x 500mm^2 Cu 3 Core XLPE, trench approx. 250m, 4 way duct bank)	2018	0.66 - 1.15
Shared Network Assets		
Two (2) 33kV feeder terminations at Pyrmont STS	2018	0.65 - 1.13
Protection & Communication	2018	0.25 - 0.44

The above cost estimates are preliminary planning estimates only and do not include any costs for easements or property acquisitions. The cost estimates have assumed that the most direct feeder routes are obtained.

The estimate does not include for any works within the Star Casino premises such as private substation or switchroom works and any associated cable reticulation.

The estimate does not allow for decommissioning of existing Ausgrid assets.

Connection Option 2 – New 11kV feeders from Darling Harbour Zone Substation and upstream 11kV network augmentation

2.1 Project Details and Other Considerations

This option involves supplying the additional load of 7MVA required by Star Casino by extending and/or augmenting the existing 11kV network that is currently supplied from Darling Harbour Zone Substation (ZS).

This option requires the installation of two (2) new 11kV feeders from Darling Harbour ZS to new on-site distribution substations within the premises of Star Casino.

Upstream 11kV augmentation works will also be required to address capacity constraints within the area. Upstream network augmentation works include load transfers between adjacent zone substations and the installation of additional capacity (e.g. new transformer and associated 11kV switchgear) at Camperdown Zone Substation.

A summary of these upstream augmentation works are specified below:

- 11kV load transfer from Darling Harbour ZS to Camperdown ZS
- Installation of a 4th Transformer at Camperdown ZS and associated 11kV switchgear

To enable the installation of new 11kV feeders from Darling Harbour ZS to Star Casino's new on-site distribution substations, consolidation works on the 11kV feeder network will also be required to free up or make 11kV feeder panels available for Star Casino. The 11kV load transfer to Camperdown ZS is required not only to free up zone substation capacity at Darling Harbour ZS but also to free up the required 11kV feeder panels at Darling Harbour ZS for Star Casino.

This option also assumes completion of the 11kV works required for the decommissioning of Blackwattle Bay ZS.

Existing 11kV feeders that are currently connected at Darling Harbour ZS may need to be relocated or rearranged to achieve a balanced group busbar loading due to the additional Star Casino load. This aspect has not been reviewed as part of this study.

The proposed cable route is expected to traverse through a very congested area due to existing and proposed cables and other existing services within the vicinity of Pyrmont STS, Darling Harbour ZS, Pyrmont St and Jones Bay Rd.

Ausgrid is facilitating multiple connection projects from Pyrmont STS and it is evident that significant design and construction challenges exist due to existing Ausgrid assets, other services and physical structures in the area. Specific attention is required during design and construction phases to prevent compromising the thermal capacity ratings of all existing and future assets in the area.

A detailed cable route and rating study will be required. A ratings review should be completed in conjunction with all other projects within the area to ensure thermal capacity ratings of all existing and proposed assets are not compromised.

It is also anticipated that non-electrical services and physical structures also exist that can contribute to physical congestion issues in the area (e.g. sewer, water mains, gas, communications). This can potentially result to a high level of complexity and/or difficulty during construction works.

A detailed investigation should be carried out to determine the practicality and/or feasibility of this option.

2.2 Fault Levels

Estimated indicative fault levels (voltage factor – 1.1) at Darling Harbour ZS in 2017 are as follows:

	Fault Level (kA)			
	3Φ Fault	2Φ - G Fault		1Φ - G Fault
		Φ - Φ	Earth	
Darling Harbour Zone – 11kV Busbar	8.11	7.10	1.93	3.12

Note: 11kV fault level is calculated based on system **NORMAL** network configuration.

2.3 Operational Details

All supplies to Star Casino will be run closed at Darling Harbour ZS.

The 11kV feeders should not be paralleled at the Star Casino end as it imposes limitations on Ausgrid's ability to operate the upstream network.

2.4 Metering

Changes to the connection arrangement may require that any revenue metering is upgraded to comply with the current version of the NSW Service and Installations Rules, NS195, the National Electricity Rules and AEMO Metrology procedures.

An appropriate metering installation must be installed at the customer's premises and as close as practicable to the agreed Connection Point as per Ausgrid Electrical Supply Standard ES3 Part A.

2.5 Protection

The requirement for the protection system will be installed as per relevant Ausgrid Standards. New optical fibre may need to be installed as required.

The design of the customer end of the feeder should not allow interconnection with any other source of supply (whether from Ausgrid or elsewhere) without prior agreement.

2.6 Land Requirements (Easements, Acquisitions, Disposals)

It is assumed that underground cable installation for most of the route will be via public roadways.

Any easement requirements are to be determined by further route investigations and negotiated/secured as part of the projects development in coordination with Ausgrid.

2.7 Option Cost Estimate

The cost estimate based on approximate Ausgrid standard costs (in 2017/18 dollars) for an assumed final arrangement and required works is given below:

Option 2		
Dedicated Connection Assets	**Need Date**	**Cost ($M)**
Install new 11kV feeders from Darling Harbour ZS, plus 11kV network consolidation where required.	2018	0.77 - 1.34
Shared Network Assets		
11kV load transfer from Darling Harbour ZS to Camperdown ZS[3]	2020	5.86 - 10.26
Install 4th Transformer at Camperdown ZS and associated 11KV switchgear	2020	3.78 - 6.61

The above cost estimates are preliminary planning estimates only and do not include any costs for easements or property acquisitions. The cost estimates have assumed that the most direct feeder routes are obtained.

The estimate does not allow for establishing new on-site Ausgrid distribution substations within the premises of Star Casino.

The estimate does not include for any private works within the Star Casino premises.

Funding Arrangements

Under Ausgrid's current connections policy, the connection applicant is required to fund all Dedicated Connection Assets and customer premises works. Ausgrid will fund Shared Network Assets provided appropriate tariff and revenue security arrangements are in place to ensure that a reasonable return is earned on this investment.

Responsibility for Costs and Contestability - General

Under current legislative arrangements in NSW, applicants are required to contribute to the cost of developing and establishing a connection. This includes costs for Ausgrid design related services and costs for Ausgrid connection related ancillary services, as well as responsibility for arranging and funding Dedicated Connection Assets as contestable connection works.

Design and construction of dedicated extensions to the distribution network, or alterations to an existing connection are arranged and funded by applicants who are also permitted their choice of Accredited Service Providers (ASPs) following the normal contestability processes.

The Ausgrid related costs (design related services and connection related ancillary services) will be dependent on the complexity and timing of the connection and are estimated in accordance with Ausgrid's Connection Policy – Connection Charges in accordance with the Australian Energy Regulator (AER) determined rates.

Further background and detailed information in relation to connecting to the network, contestability and related topics as can be found on the Ausgrid website www.ausgrid.com.au.

[3] The 11kV load transfer to Camperdown ZS is mainly required both to free up the required 11kV feeder panels and capacity at Darling Harbour ZS to connect Star Casino.

Next Steps

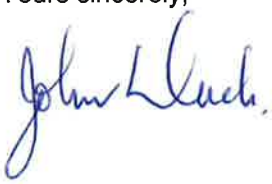
The system planning study for your proposed development is now complete. In accordance with the Contract for Design Related Services, these services have been carried out at an hourly rate with the recovery of these costs being determined via regulated rates set by the Australian Energy Regulator (AER).

It should be noted that the applicability of the information contained in this response may diminish over time.

Technical requirements for the connection will need to be ascertained through a range of technical assessments, which will need to be undertaken by you as part of developing a Connection Application and detailed design and also by Ausgrid in preparing Design Information and a subsequent Connection Offer.

After reviewing this information, it may be advisable to arrange a meeting with Ausgrid to discuss this response and to help address any immediate concerns prior to selecting your preferred connection option.

Yours sincerely,



John Duck
Senior Engineer – Major Connections

THE STAR
CASINO COMPLEX, PYRMONT NSW

INCREASE CAPACITY REQUIREMENT PROPOSAL

Att: John Duck
Senior Engineer / Major Connections / Ausgrid

Following up from our recent discussion we provide the following information for your review in moving forward with some initial planning for the increased capacity for The Star.

As previously requested by The Star, the intent is to increase the supply capacity at The Star from its current limitation of 12.2MVA by an additional 7MVA.

This increase is not required all in one go but will be required in stages. At this stage, the Star's requirement for load increase increments will be as follows:

- Stage 1 increase of 2MVA by November 2018. (including augmentation of existing 11kV Network);
- Stage 2 increase of another 2MVA by November 2019. (No additional augmentation required);
- Stage 3 increase delivery of final 3MVA by November 2021 (along with an additional new substation on site).

For The Star to gain access to the additional capacity, it will be necessary to free up capacity within The Darling Harbour Zone Substation and the intent is to augment the existing 11kV network so as to increase the available capacity servicing The Star.

On the following pages are sketches of the proposed augmentation to the 11kV network.

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Figure 1 - The Star: Existing Ausgrid 11kV network (Darling Harbour Zone)

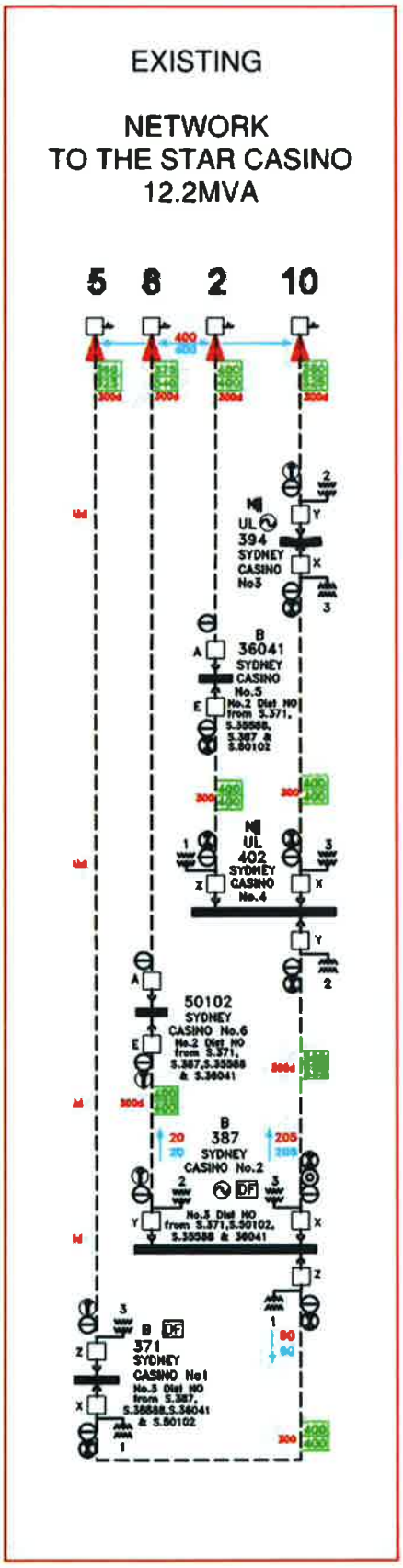

Figure 2 – The Star Stage 1: Augmentation to the Ausgrid 11kV Network

It is proposed to install two new 11kV feeders from panels within the Darling Harbour Zone Substation that are either existing or will be created as spare by shifting load to Camperdown Zone Substation. These new 11kV feeders are proposed to connect into the existing Ausgrid 11kV network as indicated.

This augmentation will increase the capacity of the existing 11kV network connected to the substations within The Star so that the existing six onsite substations can operate to their full capacity. Note that OAFD protection upgrade works will also be implemented within the existing substations.

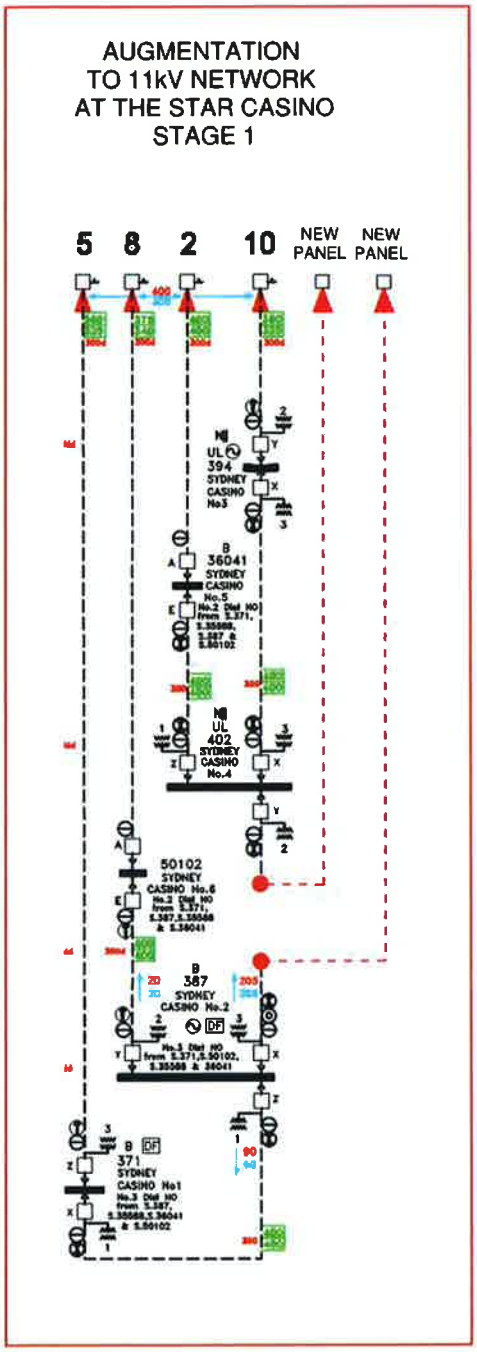

Figure 2 – The Star Stage 3: Augmentation to the Ausgrid 11kV Network

It is proposed to install a new seventh Ausgrid 11kV / 415V substation (3x1500kVA) at The Star to supply the new Hotel development. The 11kV linkage point for this substation could come directly from the The Star's dedicated 11kV feeder panels within the Darling Harbour Zone Substation as indicated, however we understand that the 11kV linkage point may be on other shared network 11kV feeder panels as directed by Ausgrid.