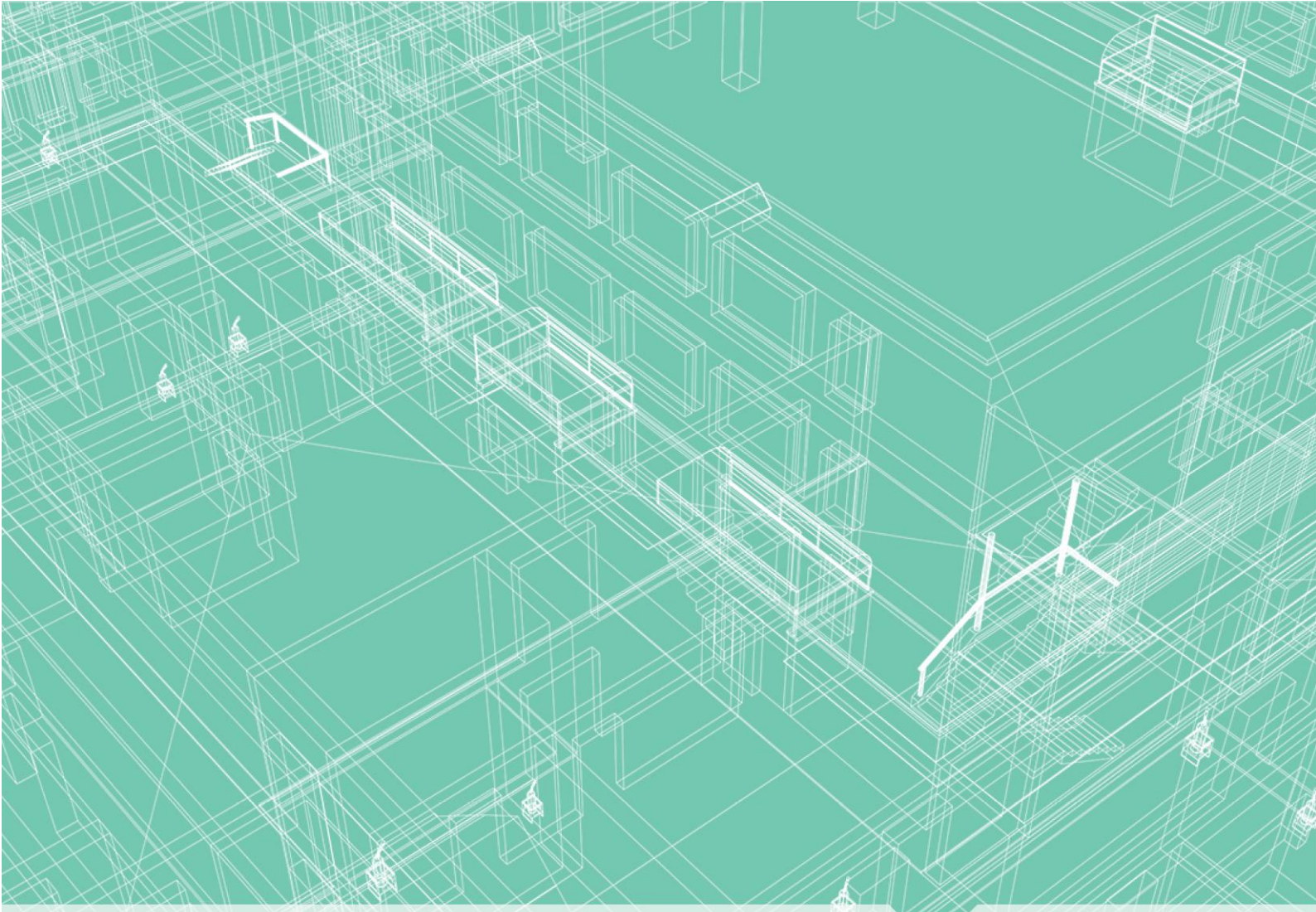


ELECTRICAL SSDA REPORT (SSD 10352)

MORIAH COLLEGE REDEVELOPMENT

JHA

JHASERVICES.COM

This report is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

DOCUMENT CONTROL SHEET

Project Number	190310
Project Name	Moriah College Redevelopment
Description	Electrical SSDA Report (SSD 10352)
Key Contact	Mark Ritchie

Prepared By

Company	JHA
Address	Level 23, 101 Miller Street, North Sydney NSW 2060
Phone	61-2-9437 1000
Email	@jhaengineers.com.au
Website	www.jhaservices.com
Author	Danny Ly
Checked	Mark Ritchie
Authorised	Mark Ritchie

Revision History

Issued To	Revision and Date						
FJMT	REV	P1	A	B	C		
	DATE	04/09/2019	05/09/2019	25/09/2019	14/10/2019		
Aver	REV	P1	A	B	C		
	DATE	04/09/2019	05/09/2019	25/09/2019	14/10/2019		
	REV						
	DATE						

CONTENTS

1 INTRODUCTION

1.1 OVERVIEW

This Electrical report has been prepared by JHA Consulting Engineers on behalf of the Moriah College / Aver Management Pty Ltd (the Applicant).

The Electrical report accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 10352) for the new Moriah College Redevelopment on Lot 3 DP 701512 (3 Queens Park Road) and Lot 22 DP 879582 (101 York Road) in Queens Park, NSW.

The proposal seeks consent for the demolishing existing buildings and a tennis court to accommodate two new buildings. The two new buildings will consist of a four storey STEAM building and a three-storey new ELC. The proposed works will be undertaken over multiple demolition and construction stages with Phase 1 involving the STEAM building and Phase 2 involving the ELC building.

The purpose of this Electrical report is to demonstrate compliance with the SEARs. This report shall be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the application. The objectives of this electrical assessment are to:

- Determine necessary lighting strategies and measures to reduce spill lighting into the environment.
- Prepare and identify infrastructure management plans in terms of service provider assets and easements, as well as whether any augmentation of existing services is required.

1.2 RESPONSE TO SEARS

The electrical report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for SSD 10352. This table identifies the relevant SEARs requirements.

Table 1: SEARs and Relevant Reference.

SEARs Item	*Report Reference*
5. Environmental Amenity *Lighting strategy and measures to reduce spill into the surrounding sensitive receivers*	Section 2
14. Utilities *Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure.* *Identify any potential impacts of the proposed construction and operation on the existing utility infrastructure and service provider assets and easements and demonstrate how these will be protected or impacts mitigated.*	Section 3

2 EXTERNAL LIGHTING AND LIGHT SPILL

2.1 SITE SURROUNDS STUDY

Figure 2.1: Site Surrounds Overview

Lighting design aims to reduce adverse effects to nearby residents, e.g. houses, users of adjacent roads- vehicle drivers, pedestrian's cyclists, transport signalling systems- air, rail and marine and astronomical observations venues.

2.2 PROPOSED EXTERNAL LIGHTING

We anticipate the development of exterior lighting is likely to be required to the areas listed below. The proposed lighting may include general landscape lighting, P-category pedestrian lighting, façade lighting, sports lighting and potential security lighting to the following areas;

- Street Entrance

The street entrance may include subtle illumination of welcome signage. The driveway may consist of pole lighting or low-level bollard lighting leading to the carpark and along the spine to facilitate safe pedestrian and vehicular movement. For any use of light poles, the placement shall be positioned facing away from residential properties to provide the required illumination to the road set out in AS/NZS 1158(2010) Lighting for Roads and Public Spaces with the minimum light spill to adjacent properties. As such, subsequent assessment shall be undertaken to ensure that lighting in this area is not providing a nuisance to neighbouring properties, and is compliant with AS4282.

- Car Park Area

The car park will utilise pole mounted luminaires. Any use of light poles shall be positioned to provide maximum illumination to the carpark with minimum light spill to adjacent properties. As such subsequent assessment shall be undertaken to ensure that lighting in this area is compliant with AS4282.

- Landscaped Areas

For landscape lighting will include low-level intimate lighting concealed into the planting and urban fabric.

- Building Facade

For facade lighting, should up-lighting be required- it will be rationalised and focused onto architectural surfaces, thereby minimising spill unto the night skies. The use of luminaire accessories will be used to reduce and manage spill light and contain the effect within the building fabric.

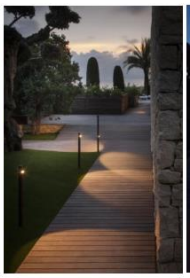
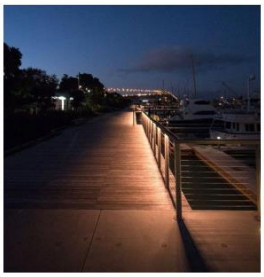
2.3 TYPOLOGIES

POST TOP LUMINAIRES



BOLLARDS




ACCENT LIGHTING




Luminaire Specification

As part of the proposed lighting design, careful selection of luminaires will aid in minimising the effects of obtrusive lighting. Below is a summary of the proposed minimum specification requirements for minimising the effects of obtrusive lighting;

- Specification of luminaires to ensure that appropriate products are specified.
- Ensure appropriate location position and aiming of luminaires to reduce spill light and glare including lenses, optics, distribution, CCT and glare accessories.
- Use specifically designed lighting equipment that will minimise the upward spread of light near or above the horizontal plane. The most sensitive/critical zones for minimising upward lighting are between 90 degrees and 100 degrees.
- Upward lighting ratio should not be more than 3%.
- While a detailed lighting design has not yet been proposed for the lighting installation, it is understood that where applicable, light fixtures will include relatively low-level LED luminaires to avoid flood or broad area high-intensity lighting where it's not required.
- Specification to comply with requirements set out in AS4282:2019 standards

Installation

- Keep glare to a minimum by ensuring that the main beam angle of all lights is directed towards any potential observer is not more than 70 degree. Higher mounting heights allow lower main beam angles, which can assist in reducing glare. In areas, with low ambient lighting levels glare can be very obtrusive, and extra care should be taken when positioning and aiming lighting equipment.
- Specification to comply with requirements set out in AS4282:2019 standards
- Comply with the requirements to control glare and keep threshold increment within the standards as defined in AS4282 for the safety of road users.
- When lighting vertical structures direct light downwards wherever possible. If there is no alternative to up-lighting, the use of shields, baffles and louvres will help reduce spill light around and over the structure.
- For Road lighting installations light near to and above horizontal should normally be minimised to reduce glare and keep the upward light ratio at less than 3%.
- Where an area is to be illuminated, and this area lies on the boundary of two zones, the obtrusive light limitation values used should be those applicable to the most rigorous zone.

Where lighting is required adjacent to residential locations, the use of shields, baffles and louvres will help reduce spill light.

2.4 EXTERNAL LIGHTING STRATEGY

The objective is to provide effective light levels throughout a certain space to complement an external activity. In terms of external lighting, the aim is to provide sufficient, safe, effective, and aesthetic lighting for the user to travel while in a dark environment. This will allow students to easily navigate throughout the campus safely during and after school hours.

The lighting strategy shall not only focus on the lighting levels on the walking surface but should also consider the types of lighting used, including colour temperature, light distribution, light output and glare properties. A good design will also incorporate the environmental landscape to achieve a safe design solution.

The lighting design aims to provide the following:

- A safe and welcoming environment for students, staff, and visitors

- Support their values and the identity of the college -
    - Awareness and feeling for Jewish traditions and ethics
    - Encouraging and dynamic teaching and learning environments
    - A safe and caring learning environment
- Guide people in wayfinding and orientation throughout the campus to help them reach their required destination
- Ambient lighting to increase visual depth allowing 'safe movement.'
- Support clear and intuitive movement
- Protection of the environment by minimising upward-facing luminaires for the reduction in light pollution
- Seamlessly integrate transition from exterior to interior spaces and vice versa
- Promote sustainable and energy-efficient luminaires as well as intelligent lighting control measures.

Emphasis will be directed towards:

- The lighting of the main entrances as well as the facades to create focal points.
- The lighting of vertical surfaces to increase the perception of a brighter atmosphere, ensuring that the design complies with AS 4282 – Control of Obtrusive Effects of Outdoor Lighting
- Creation of multiple outdoor spaces within the campus by using a layering lighting technique, enhancing the movement throughout the campus
- Seamless integration of all external luminaires to blend in with architect designs
- Concealing and cowling luminaires wherever needed.

The lighting design shall take into consideration the environmental features surrounding the college, as well as the architectural layouts to provide a seamless lighting solution for the college.

Key components which shall be developed with architectural and landscape vision include:

- Provide a safe and flexible outdoor environment, seamlessly integrating with the surrounding environment
- Accentuate building facades and entrances to provide a safe and inviting campus
- Coordinate external lighting with the development of future works to ensure a cohesive solution.

A lighting control mechanism is highly recommended to reduce energy consumption and to allow lighting only when needed. A time switch is recommended for curfewed times. The light intensity may also be reduced or switched off for certain spaces as well.

High-quality lighting will be implemented, considering the luminaire output, type of light distribution and quality of the external fitting to support visual qualities and pedestrian movement. A recommendation for external lighting is 3000 K luminaire, as it is a warm white fitting which provides a sense of comfort, safety and excellent contrast.

2.5 MEASURES TO REDUCE LIGHT SPILL

Key considerations in the reduction of spill light:

- The site location is considered to be located in a suburban environment with immediate proximity to Queens and Centennial Parks on all sides of the proposed development.
- Hours of operation and its surrounds -
    - Types of surrounding properties such as residential as there are different considerations for timing and controls outside of the hours of operation

- Site-wide time settings appropriate to ensure all boundaries of the site are controlled in a homogeneous fashion.
- Lower levels of light across the site and along various entries could be set differently depending on their proximity or residential areas if required.

The following are proposed to reduce spill light on sensitive use areas:

- Luminaires selected with appropriate distribution
- Minimal upwards light
- Minimisation of direct visibility of light sources
- Cowling light sources where required
- Intelligent lighting control equipment
- Consideration of sightlines to minimise threshold increment to oncoming traffic and pedestrians

3 UTILITY INFRASTRUCTURE

3.1 CHAMBER SUBSTATION - AUSGRID

The School has a dedicated chamber substation adjacent the open Basketball Court. The 1000 kVA substation connects to the School's main switchboard via a dedicated low voltage distributor. The substation also has a separate low voltage distributor which serves the Primary School as well.

See following original easement and right-of-way (ROW) easement plans for the property which are still current today.

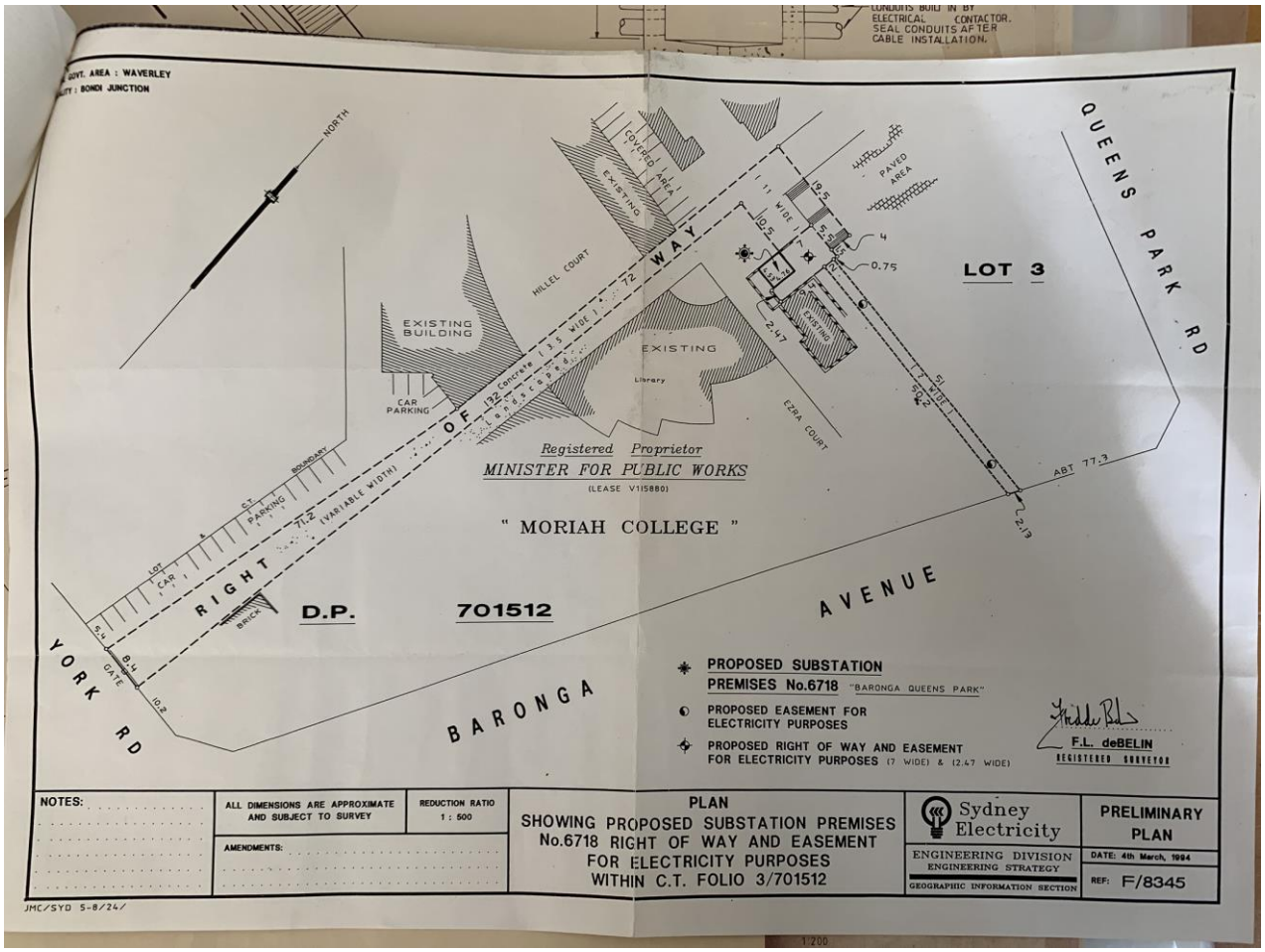


Figure 3.1: Current Ausgrid Right-of-Way (ROW) Easement

3.2 ACCESS AND RIGHT OF WAY

As per Ausgrid's standards and specifications, an easement for vehicular ROW into the property to service the substation is required. This is shown on the image above extending from York Rd into the middle of the property.

The proposed new plans will interfere with ROW easement set aside for Ausgrid. This issue can be resolved by introducing a new ROW easement from Baronga Avenue.

JHA have been in discussions with Ausgrid to coordinate and determine the new ROW for the site. Please see Figure 3.2 below for the proposed new ROW plan for access into the existing substation.

An Application for Connection (AFC) has been submitted on the 19th September 2019 for confirmation of load and also approval for the new ROW. Refer to Section 3.4 for the AFC and Ausgrid Remittance / confirmation of receipt.

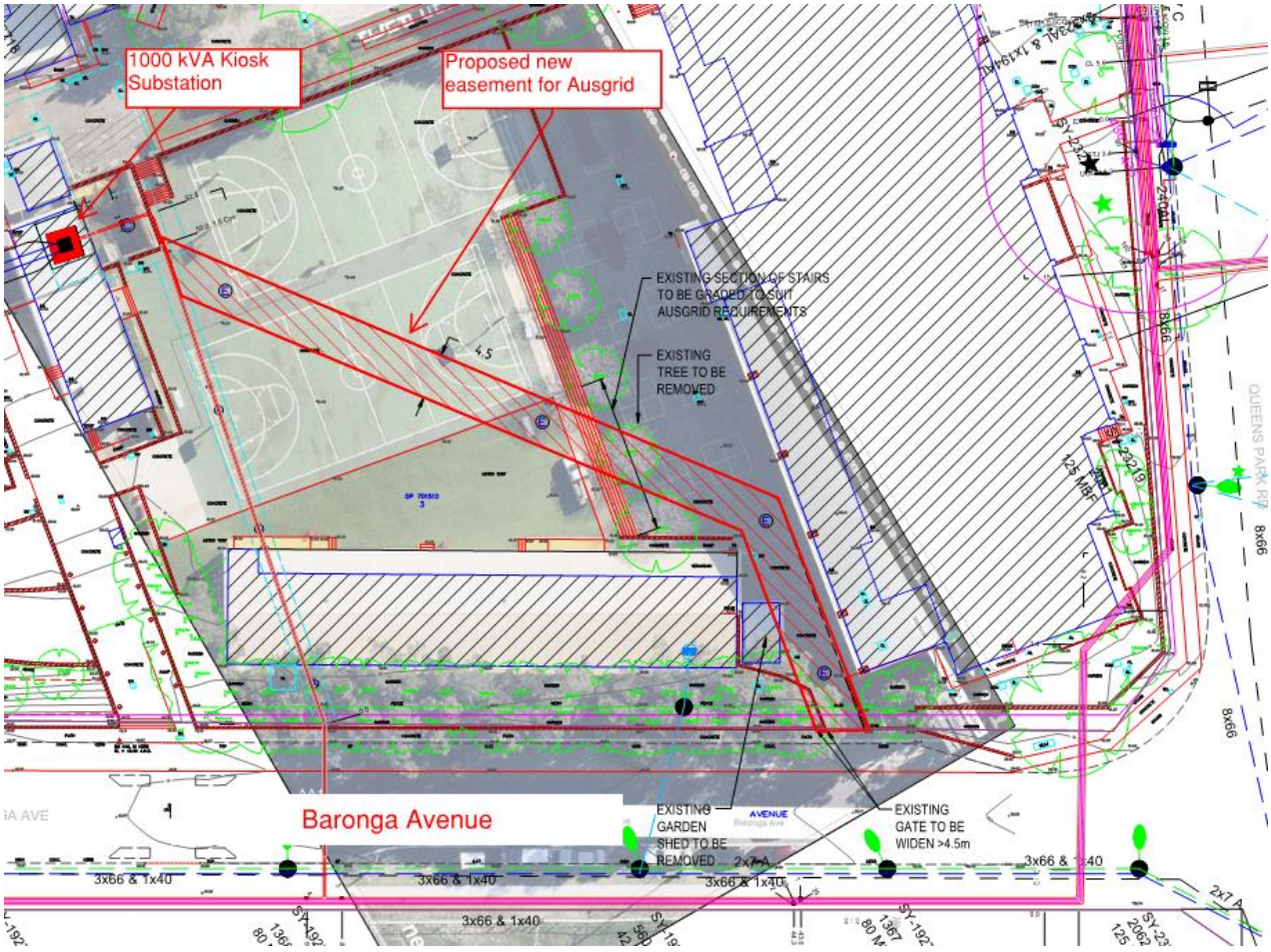


Figure 3.2: Proposed New Ausgrid Right-of-Way Easement

3.3 EXISTING CAPACITY – MAXIMUM DEMAND

The maximum demand for the proposed stage 1 works has been calculated using VA per square metre calculations as well as previous energy bills supplied by Moriah College. Table 3.1 below shows the overall maximum demand. Recent energy bills are accurate and from the last twelve months. Moriah College has also installed 100kW of solar panels on Fink Building which was activated and commissioned by Ausgrid on Thurs Sept 20th 2018.

Table 3.1: Stage 1 Maximum Demand

1	Existing Maximum Demand of School -Primary School	=	198	kVA
2	Existing Maximum Demand of School -Secondary School	=	537	kVA
3	Existing Maximum Demand of School -Caretakers RES CNR Queen Park road, Baronga Avenue, Bondi Junction	=	10	kVA
4	Total Existing Electrical Loads being removed during	=	-293.7	kVA
5	Total New Elecrical loads being added during school - Stage 1-upgrading works	=	546	kVA
	New Maximum Demand of School	=	**987**	**kVA**
			OR	
			1425	**Amp**

The total maximum demand for Stage 1 equates to 987 kVA. This figure has taken into consideration the removal existing buildings to be demolished during this stage.

The current 1000 kVA chamber substation is predicted to be sufficient to supply Moriah College with all of Stage 1 works. Ultimately the final decision rests with the supply authority to which they will respond to our recent application for connection (AFC) which has recently been submitted.

3.4 APPLICATION FOR CONNECTION

JHA have submitted and Ausgrid AFC on the 19th September 2019 for the proposed additional site load and commencement of the new ROW access to the existing chamber substation. Refer to the Appendix A for the Ausgrid AFC and Ausgrid Remittance / confirmation.

4 SUMMARY AND CONCLUSIONS

This report forms part of the documentation package to be submitted to the Department of Planning as part of the State Significant Development Application.

This report establishes the control measures undertaken to ensure that external lighting shall be designed to a suitable level, embracing the light, shade, and subtle contrasts. The light spill will be minimised through the use of dimming technology, timers, types of luminaires used, and the colour temperature.

The 1000 kVA chamber substation will have sufficient power supply to accommodate for the future works. A new right-of-way easement for Ausgrid will be needed as the proposed plans show that they are being built over an existing easement.

Attached in Appendix A is the Application for Connection to Ausgrid which has been completed and sent.

5 APPENDIX A: APPLICATION FOR CONNECTION