MASTER PLANNING REPORT

ST ANTHONY OF PADUA

140 ELEVENTH AVENUE, AUSTRAL NSW 2179

ELECTRICAL SERVICES

JHA

CONSULTING ENGINEERS

DOCUMENT CONTROL SHEET

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CONTENTS

1 INTRODUCTION

1.1 GENERAL

The following report has been prepared exclusively for Sydney Catholic Schools – SCS in response to a proposed development on an acquired amalgamated lot in Austral NSW, 2179. JHA are working with Munns Sly Moore Architects for the master planning of this project.

The development (see Figure 1), predominantly consists of school grounds and associated education facilities. Adjacent are community areas such as:

Market Garden
Easily accessible to the community, this space provides a relaxed external learning space integrating agriculture and hospitality into the school's curriculum.

The Piazza
A formal entry area featuring access to a café and 'The Forum'; the space consists of a hall, bell tower and a grassed amphitheatre.

The Forum
The heart of the school, connecting the junior, middle and senior learning spaces; this space provides a range of formal and informal spaces for students to learn and interact.

Church
Located adjacent the Piazza, and new Church for the community will be accessible directly from Eleventh Ave.

1.2 THE SITE

The development site, neighbouring the central district of Austral is rich with history. Initially settled as large pastoral and forestry lands, in was not until the years immediately before and after the Second World War that the area underwent a major phase of development to compliment the prior subdivision of the land. An influx of migrant settlers from Europe and South-East Asia (later) developed the area into a booming agricultural centre during the mid and late nineties.

The history of the area is still very much present today, where the land retains its distinct semi-rural character with houses adjacent to open paddocks, canals and the occasional small farm. The precinct is now under development under direction from the Greater Sydney Commission. The area has been zoned with a residential focus and allowances made for accompanying retail and commercial locations.

The proposed site will have three frontages to Eleventh, Tenth and Fourth Avenue consisting of an area approximately 108,000 m^2. Currently the site is surrounded by residential and unused allotments with a small local shopping centre located nearby (Edmondson Ave); consisting of a post office, supermarket, convenience stores and restaurants.

The proposed site is accessible via major Sydney transport infrastructure including the M7 Westlink (7 Km) and M5 motorway (8 Km), as well as public transportation services between Rutleigh Park (855 -Austral to Liverpool) and Leppington station.

1.1.1 SITE LOCATION

The following figures (1-3) show aerial detailing of the proposed site location, including;

- Satellite imagery
- Architectural site planning

All architectural have been prepared by MUNNS SLY MOORE ARCHITECTS PTY LTD.

Note: The proposed site is located within the translucent polygon.
Figure 1 – Proposed amalgamated site - satellite imagery.

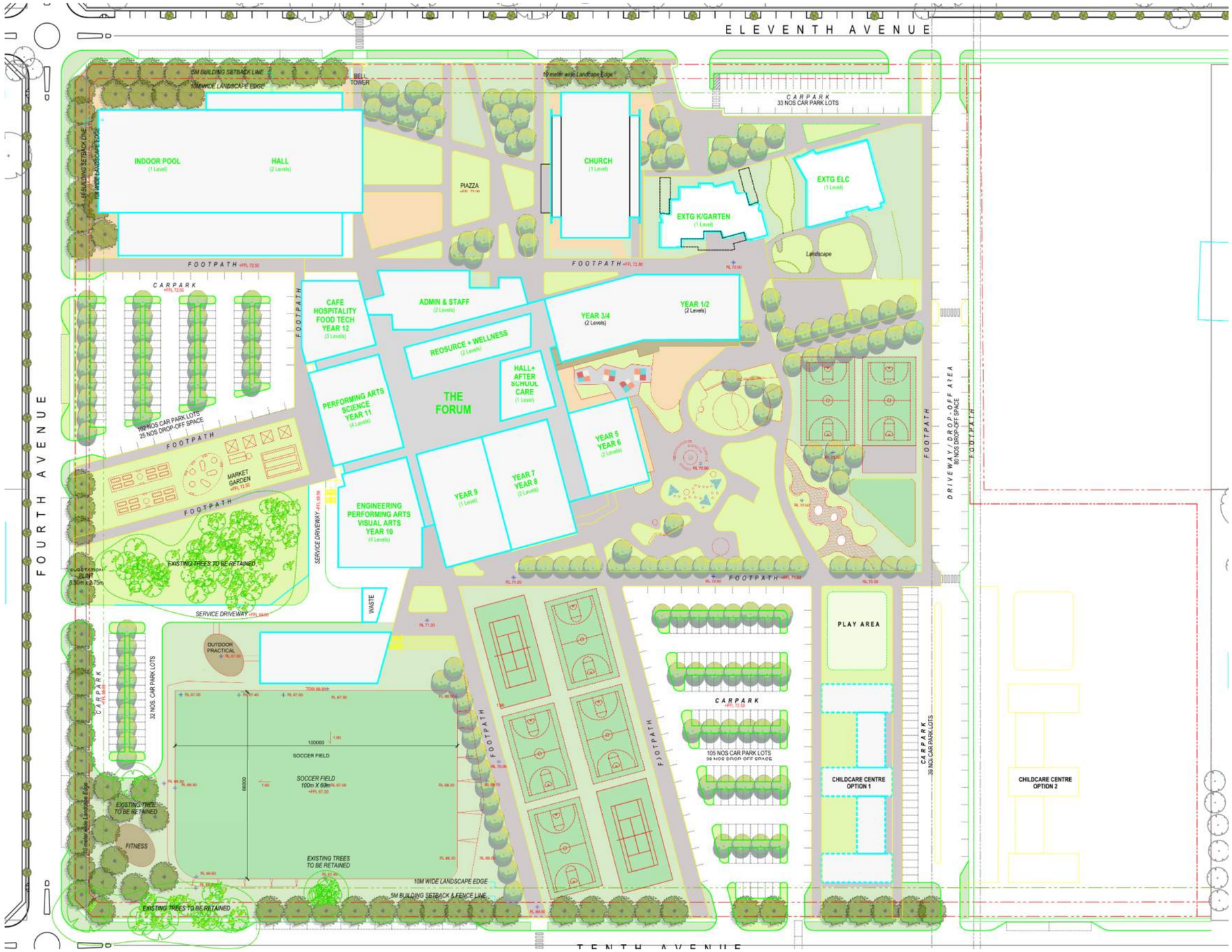


Figure 2 – Site plan for proposed development

Source: Masterplan St Anthony of Padua Catholic School – Munns Sly Moore Architects

2 UTILITY ENGINEERING SERVICES

2.1 UTILIES SERVICES REVIEW / ANALYSIS

A utilities review has been carried out in consultation with the relevant local authorities to identify the existing utilities at the site.

Dial before you dig (DBYD) requests were submitted on the 20 October 2015 to investigate the presence of existing utilities such as natural gas, water, stormwater, sewer and telecommunications. In addition a subsequent request was submitted on the 25 January 2016 in order to ensure there was no change in the presence of existing utilities.

The following utilities with interests / assets in the vicinity of the site were notified in this process:

Seq. No.	Authority Name	Phone	Status
50385743	Endeavour Energy	0298534161	NOTIFIED
50385745	Jemena Gas West	1300880906	NOTIFIED
50385742	PIPE Networks, Nsw	1800201100	NOTIFIED
50385746	Sydney Water	132092	NOTIFIED
50385744	Telstra NSW, Central	1800653935	NOTIFIED

END OF UTILITIES LIST

Figure 4 – Dial before you dig utilities notification status.

The utility review process revealed that no major assets exist on site and therefore services in the area will not be interrupted during development. However this also deems it necessary to direct alternative services to the site in order to provide access to certain utilities.

No known communications and power infrastructure existing along Tenth Avenue with sufficient capacity to service the site. High Voltage infrastructure in the immediate area surrounding the site will allow for instillation of a new substation to service the site (see following section). Communications infrastructure surrounding the immediate site is sparse and will require further works to connect to the site (see Section 4).

3 ELECTRICAL SERVICES

3.1 ASSUMPTIONS

The following assumptions have been made in carrying out this assessment:

- Site area of approximately 19, 500m^2;
- 16,434m^2 of department space;
- Multiple independent facilities;

3.2 ELECTRICAL MAXIMUM DEMAND

Early calculations based on conceptual architectural building envelopes and kVA per square metre rates indicated the maximum demand would exceed the capacity of a single substation. It would be beneficial to SCS and to the overall planning of the School that this figure is rationalised against more accurate building layouts prior to making contact with the Authorities. As such, further consultation with the Architect's is ongoing with the aim to achieving a more accurate maximum demand figure. The following table indicates maximum demand figures calculated to date.

Table 1 – Maximum demand Calculations

Space	**Quantity**	**Area** *(m^2)*	**Assumed general Lighting & power use** *(VA/m^2)*	**Assumed airconditioning use** *(VA/m^2)*	**Load** *(kVA)*	**Load per Phase** *(A)*
Lower Ground						
Circulation/Foyer		331			0.00	0.00
Trade Training Centre						
Auto Workshop		60	50	35	5.10	7.08
Store	2	250	10		5.00	6.94
Theory	2	170	40	35	25.50	35.42
Metal Engineering		425	50	35	36.13	50.17
Meeting, Office and Recreation		60	40	35	4.50	6.25
Engineering						
Wood Work		170	50	35	14.45	20.07
Circulation + Breakout		425	10		4.25	5.90
Metal Work Workshops		425	50	35	36.13	50.17
				Lower Ground Total	131.1	182.0
Site plan (Ground)						
Theory		85	40	35	6.38	8.85
Theory		60	40	35	4.50	6.25
Electro Skills		250	40	35	18.75	26.04
Practical		170	40	35	12.75	17.71
Construction Store & Toilets		425	10		4.25	5.90

Performing Arts						
Music Rooms/Practise Rooms & Storage		80	20		1.60	2.22
Drama Store		24	10		0.24	0.33
Store		22	20		0.44	0.61
Dance		114	60	35	10.83	15.04
Blackbox Theater		200	100	35	27.00	37.50
Theatre/Auditorium		678	100	35	91.53	127.13
Toilets		53	20		1.06	1.47
Changing Rooms/Dressing Rooms		105	20		2.10	2.92
Admin & Staff						
Toilets		53	20		1.06	1.47
Access Toilets		5	20		0.10	0.14
Careers Counselling		106	40	35	7.95	11.04
Pastoral Care		40	40	35	3.00	4.17
Admin and Staff		381	40	35	28.58	39.69
Hospitality Café						
Restaurant		113	80	40	13.56	18.83
Canteen		32	80	40	3.84	5.33
Café Seating		160	80	40	19.20	26.67
Hospitality		154	40	35	11.55	16.04
Cool Room		16	40	60	1.60	2.22
Male		7	20		0.14	0.19
Female		7	20		0.14	0.19
Preparation Room		47	40	35	3.53	4.90
Other buildings						
Wellness Centre		110	40	35	8.25	11.46
Hall		420			0.00	0.00
Year 7		600	40	35	45.00	62.50
Year 5/6		600	40	35	45.00	62.50
Church		1220	40	35	91.50	127.08
K/garden		808	40	35	60.60	84.17
ELC		659	40	35	49.43	68.65
Carpark		1051			0.00	0.00
Passive + Active Outdoor Learning Space		3128			0.00	0.00
Carpark		35			0.00	0.00
Playcourts		35			0.00	0.00
The Forum		1508			0.00	0.00
Corridor		3554			0.00	0.00
Circulation Foyer		337			0.00	0.00
Prayer Room		80	20	5	2.00	2.78
Hall + Gymnasium						
Hall + Gymnasium		1933	60	40	193.30	268.47
Chainging Rooms + Toilets		45	20		0.90	1.25
Stage		192	80	40	23.04	32.00
Changing Rooms + Toilets		44	20		0.88	1.22
Year 1/2						
Office		23	40	35	1.73	2.40
Toilets		16	20		0.32	0.44
After school care		16	40	35	1.20	1.67
Toilets		62	20		1.24	1.72
Corridor Common	2	279			0.00	0.00
Corridor Ground		228				
Withdrawl	8	9	20	5	1.80	2.50
Store	8	7	10		0.56	0.78
Collaboartive Space	8	74	40	35	44.40	61.67
Makerspace	8	40	40	35	24.00	33.33
Quiet Space	8	40	40	35	24.00	33.33
Presentation Room	8	40	40	35	24.00	33.33
Store	2	8	10		0.16	0.22
Toilets	2	16	10		0.32	0.44
Toilets	2	16	10		0.32	0.44
Future works						
Future Sports Centre		3037			0.00	0.00
Future Library		1366			0.00	0.00
Future Childcare Play Area		1731			0.00	0.00
Future Childcare centre		1184			0.00	0.00
Staff Carpark		10037			0.00	0.00
Basketball Courts		5137			0.00	0.00
				Ground Level Total	919.6	1277.2
Level One						
Visual Arts						
Print Work Room		65	40	35	4.88	6.77
Shared Storage		64	25		1.60	2.22
Digital Studio		80	50	35	6.80	9.44
Collab Space		273	40	35	20.48	28.44
Print Making Studio		177	40	35	13.28	18.44
Multi media studio		170	50	35	14.45	20.07
Ceramic Studio		151	80	35	17.37	24.12
AWC		107	20	5	2.68	3.72
Performing Arts						
Performing Arts		678	80	35	77.97	108.29

Other buildings						
Year 9		600	40	35	45.00	62.50
Year 8		600	40	35	45.00	62.50
Year 5/6		600	40	35	45.00	62.50
Informal Learning Space		314	20	5	7.85	10.90
Study Area		155	20	5	3.88	5.38
Corridor		1721			0.00	0.00
Science						
Science Lab		76	40	35	5.70	7.92
Biology Lab		78	40	35	5.85	8.13
Chemistry Lab		85	40	35	6.38	8.85
General Learning/Collab Space		250	40	35	18.75	26.04
Staff and Store		51	10		0.51	0.71
Admin and Staff						
Male Female Toilets		38	20		0.76	1.06
AWC		6	20		0.12	0.17
Admin and Staff		528	40	35	39.60	55.00
Corridor		34			0.00	0.00
				Level One Total	383.9	533.2
Level Two						
Visual Arts						
Year 10		620	40	35	46.50	64.58
Year 11		630	40	35	47.25	65.63
Year 12		600	40	35	45.00	62.50
Admin & Staff		600	40	35	45.00	62.50
Corridor		360			0.00	0.00
AWC		109	20		2.18	3.03
Male/Female		36	20		0.72	1.00
AWC		5	20		0.10	0.14
Informal learning Space		53	20		1.06	1.47
				Level Two Total	187.8	260.9
				Overall Total	1622.34	2253.26

Note: Values with centred alignment are either estimates based on general spaces, or possible oversized/generalised areas.

1.1.2 NEW KIOSK SUBSTATION

A new substation(s) will be required to meet the power demands for the site. Fortunately, there are high voltage feeders reticulating along Fourth Avenue and Eleventh Avenue for the development to connect in to.

The aforementioned maximum demand currently exceeds the capacity of a single substation offeded by the local Supply Authority by a factor of approximately 8%. It is the recommendation of this office to plan not only an initial substation location as detailed in the existing Stage 2 design but a secondary location on the opposite side of the property.

The following sketch indicates a recommended initial connection point, the required roadside infrastructure as well as the proposed secondary substation location if ever needed.

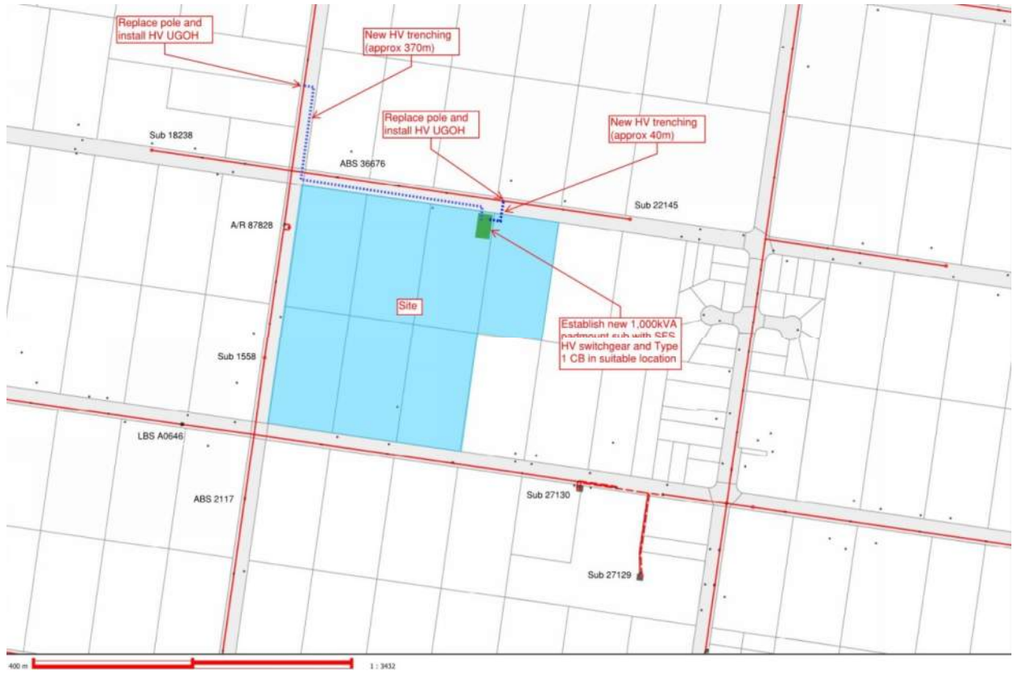


Figure 5 – High voltage Markup – New substation.

Costings for substation works can be further advised once a more accurate figure for maximum demand is known. The following requirements associated with the use of kiosk substation must be met for electrical safety, maintenance and compliance with relevant Australian standards and energy provider requirements:

- Substation is to be located in an area that provides direct access for maintenance trucks typically on the boundary, accessible from the street.
- If not located on the boundary, a right of way easement will need to be created to provide access to the substation location.
- Preferably sited on grade; suspended slabs with dispensation is acceptable;
- Maintain an exclusion/blast zone of six metres (6m – string line) from any apartments, balconies and/or openable windows;
- Walls within two metres (3m) of the easement must be 3MRE fire and noise rates; and,
- Free to air; i.e. no encroachments from above
- Must not be located within 5m of Telecommunications pits, 10m of fire hydrants, and 3m of non-fire rated buildings
- Easement must be level of the size of the easement
- Easement dimensions are 5.5m X 2.75m – refer attached spatial

In addition to the above, the exclusion zone around the proposed kiosk substation must be maintained as indicated by the following spatials specific to Endeavour Energy's (the local energy provider) requirements.

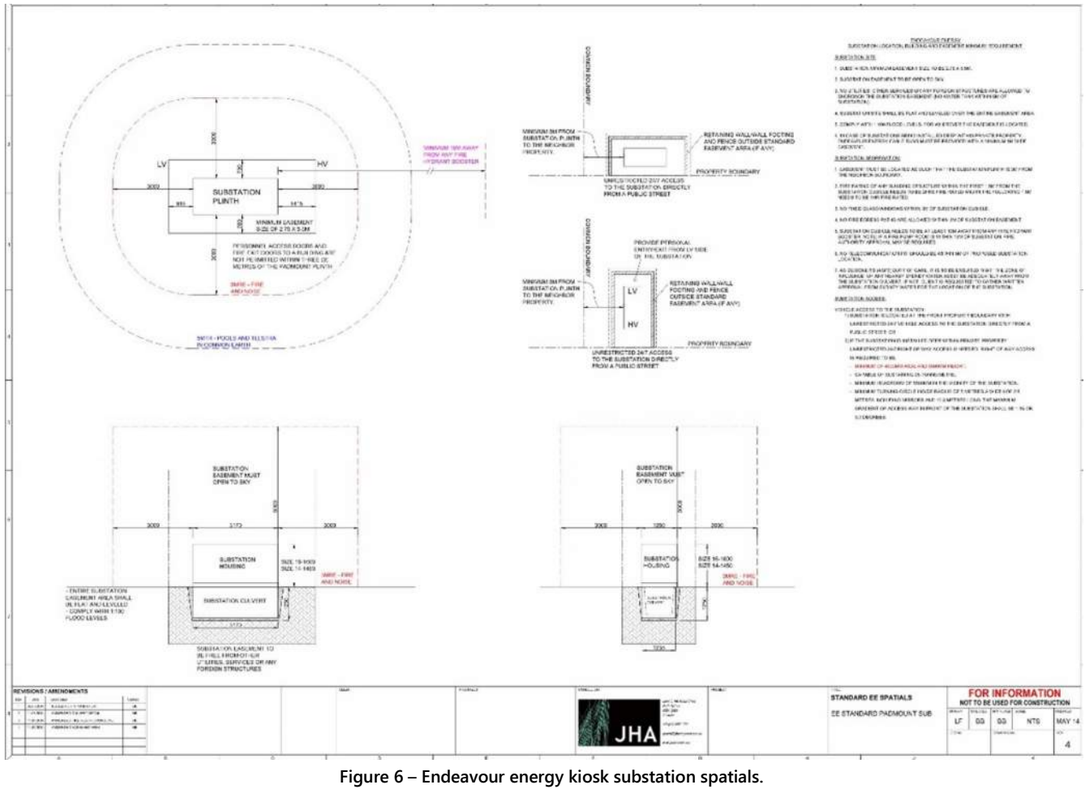


Figure 6 – Endeavour energy kiosk substation spatials.

The following additional items will need to be considered as part of the overall development planning for the site.

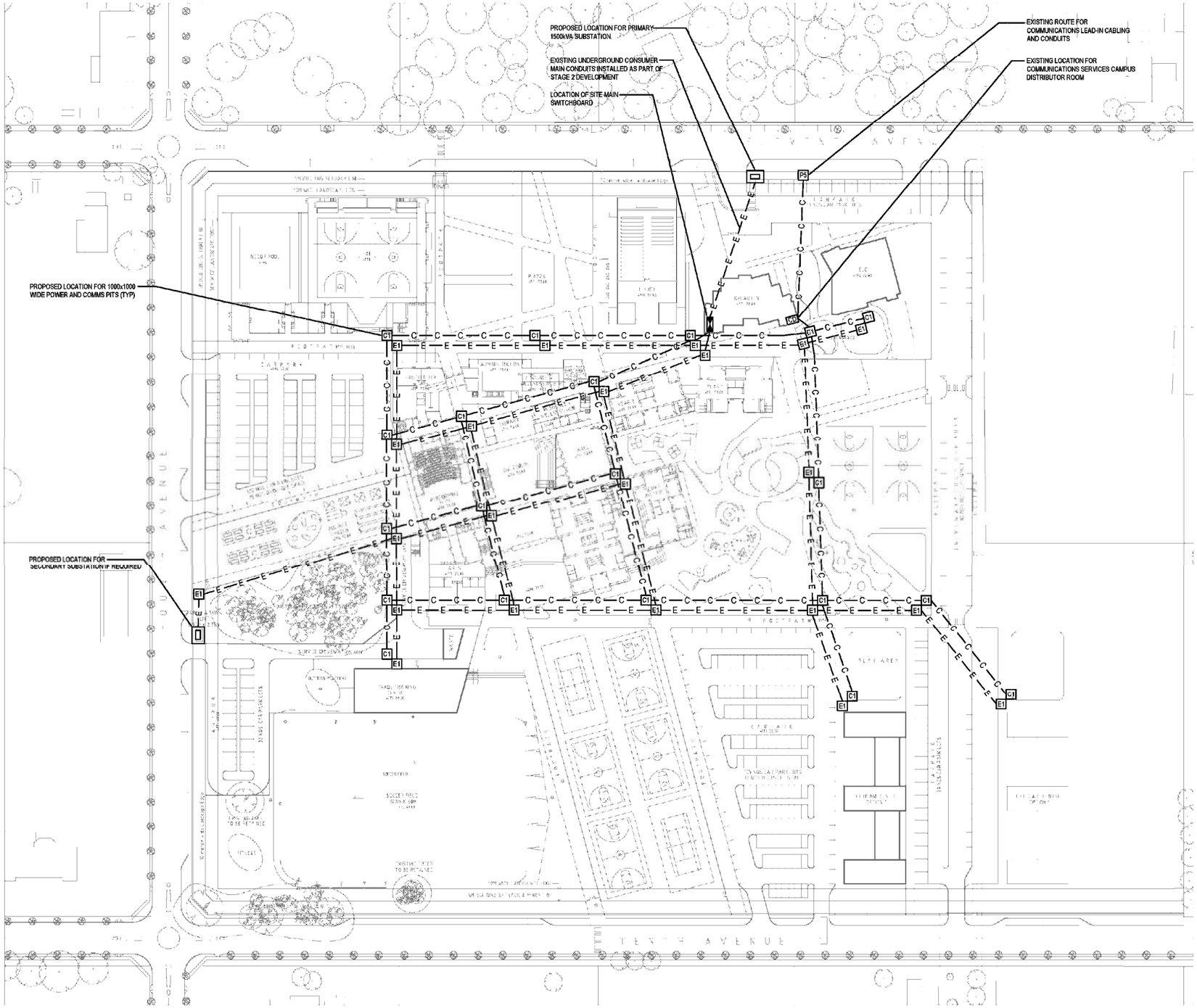
- The existing roads are rural in nature and consist of a simple bitumen road surface and dirt/gravel shoulder with no kerb and guttering. Should the roads be upgraded as part of the works with new kerb and guttering or otherwise, the existing poles may be impacted and require relocating. Further, taller poles may be required if ground levels are raised or poles replaced due to undermining of footings from the installation of other services (e.g. water mains). The necessary rectification works for these cases will significantly add to the cost of the overall project and has not been considered in our report.
- Council may request the proposed bus bays along Tenth Ave, Eleventh Ave and Fourth Ave , as well as the general school frontage to have lighting provided in accordance with AS/NZS 1158. Retrofitting the existing poles with new lights is unlikely to achieve compliance with this standard due to the long spans of the existing poles. As such, the existing poles will need to be relocated as well as new poles being installed. Alternatively, new light columns could be installed along the boundary of the site. These potential works have not been considered in our review and are not shown in the provided sketches.
- Spare capacity of the feeder can only be determined from a formal submission to Endeavour Energy. It may be required to augment portions or sections of the HV network remote to the site in order to make sufficient capacity available. These works cannot be costed at this point in time due to the unknown works.

Once the architectural designs and DA submission has progressed sufficiently far to allow a more accurate maximum demand application and substation location to be resolved, the follow general process will need to be followed to obtain a certified design for the proposed substation. Please note that the timeframes provided are indicative only and are subject to the full requirements of the project and EE response times.

- Submit a formal Connection of Load application to EE for the proposed load.
    - This process generally takes 2-3 weeks for EE to acknowledge and respond with their Supply Offer
- Prepare and submit a Proposed Method of Supply to EE outlining the proposed connection method.
    - This process generally takes 2-3 weeks for a Level 3 ASP to complete, with a further 3-4 weeks to EE to acknowledge and respond with their Design Brief
- Prepare and submit detailed designs and documentation to EE for certification
    - The length of this process depends on the complexity of the network changes, response times of third parties such as Council. Allow a minimum of 4 weeks. Allow a further 4-6 weeks for EE to review and certify the design
- Engage a Level 1 ASP to construct the project
    - Construction of a project like this typically takes a minimum of 10 weeks. This allows the substation to be ordered and delivered on site, as well as organising the required network outages. Other factors such as presence of other utilities, obtaining approvals such as road occupancy, and wet weather can also impact on this time
- Engage a Level 2 ASP to connect the site to the sites Main Switchboard

3.3 SITE RETICULATION

A site reticulation plan including trenching and service pits has been developed to provide power to each of school buildings on the site. The main switchroom and campus distributor room are located at either end of the existing kindergarten building, housing the main switchboard and campus distributor respectively. A shared services trench (running east-west) will feed the eastern community buildings as well as administration and the southern school buildings; independent smaller trenches will feed the childcare, kindergarten and preschool. The following layout shows a detailed analysis of the site power and comms reticulation.



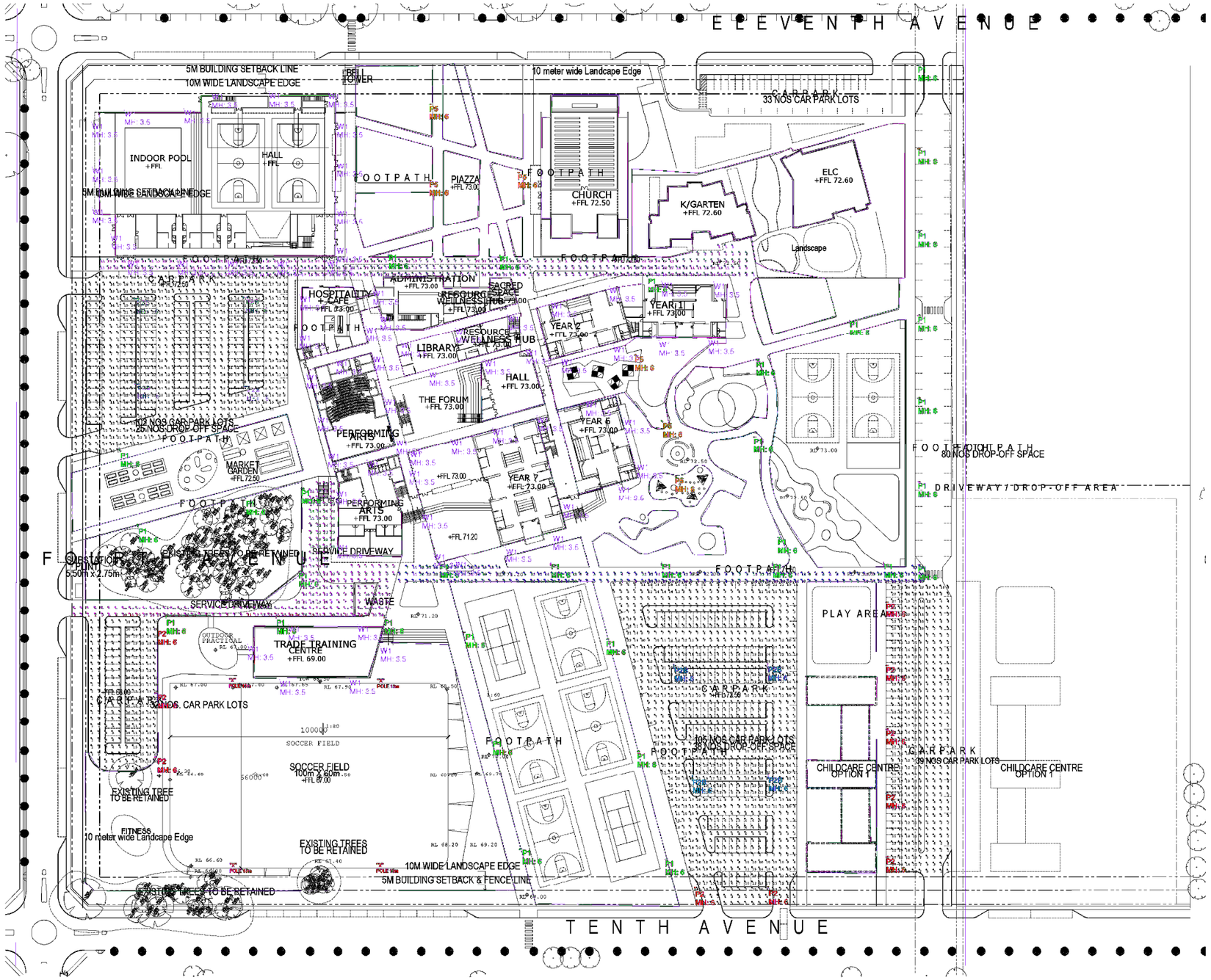
LEGEND

- NEW DISTRIBUTION BOARD
- MAIN SWITCHBOARD
- [E] NEW HEAVY DUTY ELECTRICAL PIT PREFABRICATED CONCRETE WITH LOCKABLE STEEL LID. (LABELLED ' ELECTRICAL'). WHERE DENOTED WITH A 'T', PROVIDE TYPE D TRAFFICABLE LIDS.
  - EX - DENOTES EXISTING PIT.
  - E1 - DENOTES 1000 x 1000mm PIT WITH 900mm DEPTH.
  - E2 - DENOTES 600 x 600mm PIT WITH 900MM DEPTH.
  - E3 - DENOTES CLASS 'D' VEHICLE TRAFFICABLE PIT
  - E4 - DENOTES 1000 x 1000mm PIT WITH 900MM DEPTH WITH ADDITIONAL 300mm PIT RISER..
- [C] NEW HEAVY DUTY COMMUNICATIONS PIT WITH LOCKABLE LID (LABELLED 'COMMUNICATIONS') UNLESS NOTES OTHERWISE.
  - EX - DENOTES EXISTING.
  - C1 - DENOTES 1000 x 1000mm PIT WITH 900mm DEPTH.
  - C2 - DENOTES 600 x 600mm PIT WITH 900MM DEPTH.
- — E — E — NEW UNDERGROUND ELECTRICAL CONDUIT (ORANGE & LABELLED 'ELECTRICAL')
- — C — C — UNDERGROUND COMMUNICATIONS CONDUIT (WHITE & LABELLED 'COMMUNICATIONS')

Figure 8 – Site reticulation plan.

3.4 SITE EXTERNAL LIGHTING

A site external lighting plan covering the pathways and external carparks has been developed to indicate the intentions of safety when accessing each of the School buildings after hours. It would be expected the Child Care Centre and certain staff activities would be active after daylight hours, particularly during the winter months. The following layouts shows the proposed location of post top luminaires and illumination levels throughout the site.

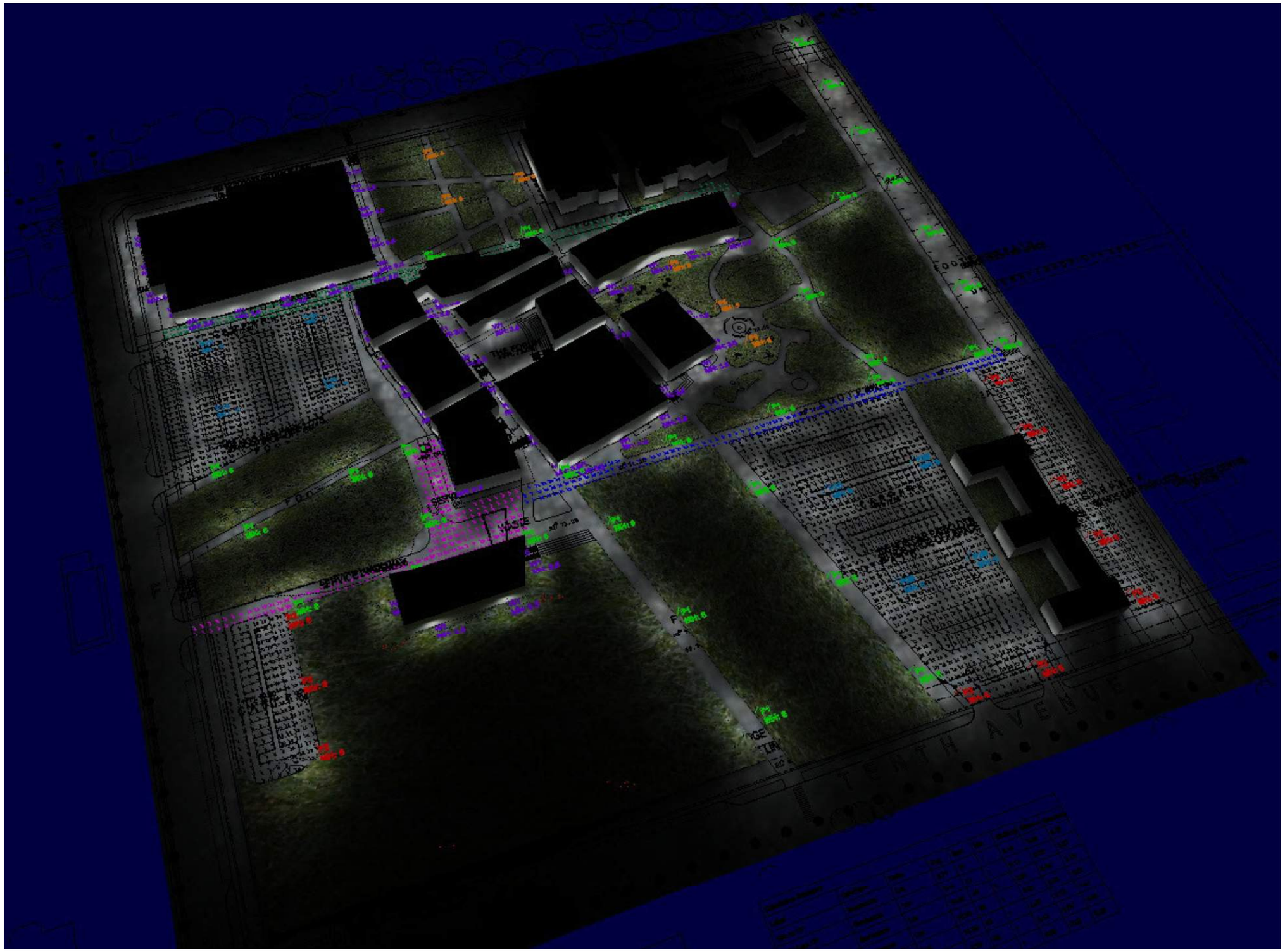


Luminaire Schedule

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Lum. Watts	Total Watts
	33	P1	SINGLE	N.A.	0.750	VP-S-36INB-79-4K-T3	71.56	2361.48
	10	P2	SINGLE	N.A.	0.750	VP-S-36INB-79-4K-T4	71.3878	713.8781
	8	P29	BACK-BACK	N.A.	0.750	VP-S-36INB-79-4K-T4	71.3878	1142.205
	6	P5	SINGLE	N.A.	0.750	VP-S-36INB-79-4K-T5W	71.6	429.6
	68	W1	SINGLE	N.A.	0.750	LNC2-16LU-4K-3	44.6	3032.8

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Max/Avg	Min/Max	Max/Avg
10th av CP	Illuminance	Lux	9.71	61	1	0.10	0.02	6.28
Child Care CP	Illuminance	Lux	9.49	31	1	0.11	0.03	3.27
Horiz Path Blue	Illuminance	Lux	14.45	47	3	0.21	0.06	3.25
Horiz Path DK Gn	Illuminance	Lux	15.94	45	1	0.06	0.02	2.81
Horiz Service DR Pink	Illuminance	Lux	14.66	51	1	0.07	0.02	3.41
Service Rd CP	Illuminance	Lux	8.68	40	1	0.12	0.03	4.61
Sports Hall CP	Illuminance	Lux	10.64	63	1	0.09	0.02	5.92



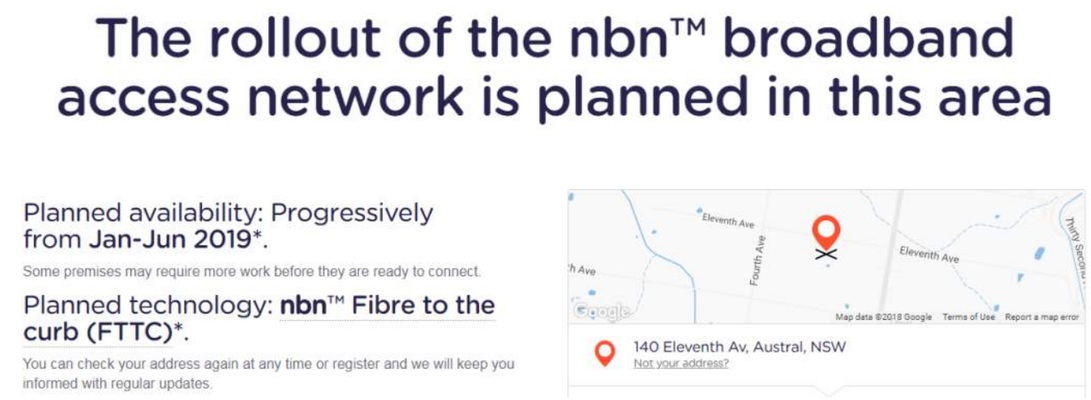
4 TELECOMMUNICATIONS SERVICES

4.1 EXISTING SERVICES

Currently there are no major existing telecommunications services within the site that will need to be decommissioned and/or diverted; any minor supplies servicing the existing buildings can be readied for decommissioned during demolition.

To the support the early start up process of the School, TPG dark fibre has been installed to the temporary Administration Cottage Building. It is understood, this fibre cable installation will be diverted to the new Campus Distributor Room during the completion of Stage 2 due to occur in the near future.

It is understood this fibre connection once relocated, will support the School in the short to medium development of the School. However, if SCS would like to transfer to NBN at some stage, it appears a NBN installation is due to start in the first half of 2019 in the surrounding area. See following screen capture from NBN website:



During the construction of Stage 1, 3-off 100 diameter telecommunication lead-in conduits have been installed from the street boundary along Eleventh Ave to the new Campus Distributor Room. One is currently planned to be used for the TPG fibre lead-in cable thus leaving two spare conduits for possible NBN or other carrier lead-in cable installations if ever needed in the future.

5 CONCLUSION

JHA Consulting Engineering has conducted an investigation into the proposed site and development plan; the following observations have been made:

- No major assets exist on site and therefore services in the area will not be interrupted during development; however, power and communications must therefore be established from alternative services locally.
- The maximum demand of the site has been calculated based on gross overall building envelopes. Ongoing discussions with the Architect are currently underway to rationalise the overall maximum demand.
- Service and Installation Rules of NSW has been investigated as to provide guidelines to the compliance of existing overhead services in the cottage area.
- The campus distributor room are to be located on the south side of the kindergarten building. (See site reticulation plan for cable trenches and service pits).
- NBN is anticipated available to the site first half of 2019.