Infrastructure Management Plan

Wentworthville Public School

70-100 Fullagar Road, Wentworthville NSW

PREPARED FOR

School Infrastructure NSW
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INFRASTRUCTURE MANAGEMENT PLAN

Activity Schedule

Date	Revision	Issue	Prepared By	Approved By
31.08.18	1	Draft for Review	S. Burgess	
08.10.18	2	Final Issue	S. Burgess	S. Burgess
13.11.18	3	SSDA Submission	S. Burgess	S. Burgess

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This document has been prepared in conjunction with the following:

1. EXECUTIVE SUMMARY

This Infrastructure Management Plan (IMP) report for Electrical, Telecommunications, Stormwater and Hydraulic services has been prepared by Northrop Consulting Engineers Pty Ltd (Northrop) on behalf of Fulton Trotter Architects for the Wentworthville Public School Redevelopment project (the Project) [1].

This IMP outlines the existing infrastructure, detailing information on the existing capacity and any augmentation to the aforementioned services required for the proposed development. The report also details records of consultation with relevant agencies. The details within this report are preliminary and based on currently available information and correspondence undertaken at the time of writing.

This report is provided in response to the Secretary's Environmental Assessment Requirements (SEARs) issued for the project and has been prepared for lodgement to the State Significant Development (SSD) application for Wentworthville Public School redevelopment. This IMP addresses the Infrastructure Management Plan requirements held within Item 14 of the SEARs.

[1] The Consulting Engineer responsible for Electrical and Telecommunications services is Northrop. The Consulting Engineer responsible for Stormwater services is Henry & Hymas. The Consulting Engineer responsible for Sewer, Water and Gas services is JHA Engineers. Northrop has compiled third party information into this singular report and shall not be held responsible for the correctness or accuracy of third party information prepared by others.

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2. DEVELOPMENT DESCRIPTION

Client: School Infrastructure NSW

Client Acronym: SINSW

State Significant Development Number: SSD 9273

Project Name: Wentworthville Public School

Project Address: 70-100 Fullagar Road, Wentworthville NSW

The Wentworthville Public School project proposes a significant expansion of the current facilities on site (Refer to Site Concept in Figure 1). The proposed works are as follows:

2.1.1 Construction of New Buildings & Facilities

- A new three-storey building accommodating new home bases, library and common facilities.
- Refurbishment and extension of existing administration spaces
- OOSH and Hall construction
- Refurbishment and repurposing of specific existing buildings (classrooms, administration facilities)

2.1.2 Site & Infrastructure Preparation Works

- Upgrade of the existing kiosk substation to supply the 525kVA load as the existing substation is rated for 500kVA only.
- Services investigation in all key areas.
- The diversion of existing internal hydraulic services to allow construction of new works including the sewer and water main within the Block G development.
- Make redundant services to demolitioned sections of buildings including Block A. Services to be rerouted to ensure remain sections of the building are functional.
- Provide the potable cold water and gas provision for New OOSH, Canteen and Hall due the location being adjacent to the temporary demountables. Upgrade of meter assemblies can occur at a later date.
- Provide services to the temporary demountable from existing infrastructure or services provided during early works.
- Upgrade of meter assemblies and new incoming services are not critical to an early works program but there would be benefits to carry this work out early.

2.1.3 Infrastructure

- Augmentation, extension and diversion of physical infrastructure and utilities as required.

3. SEARS ISSUES ADDRESSED

This report addresses how the proposed project addresses Item 14 of the SEARs and outlines strategies relating to Utilities. These requirements are outlined below alongside where the response to each can be found within this report;

Item	Action to Address the Requirement	Report Location
Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.	This IMP report details the existing hydraulic and electrical services infrastructure available to service the proposed development.	

4. SITE DESCRIPTION

4.1 The Site

The proposed site of works is located on the existing school campus and comprises of extensions, refurbishments and new buildings.

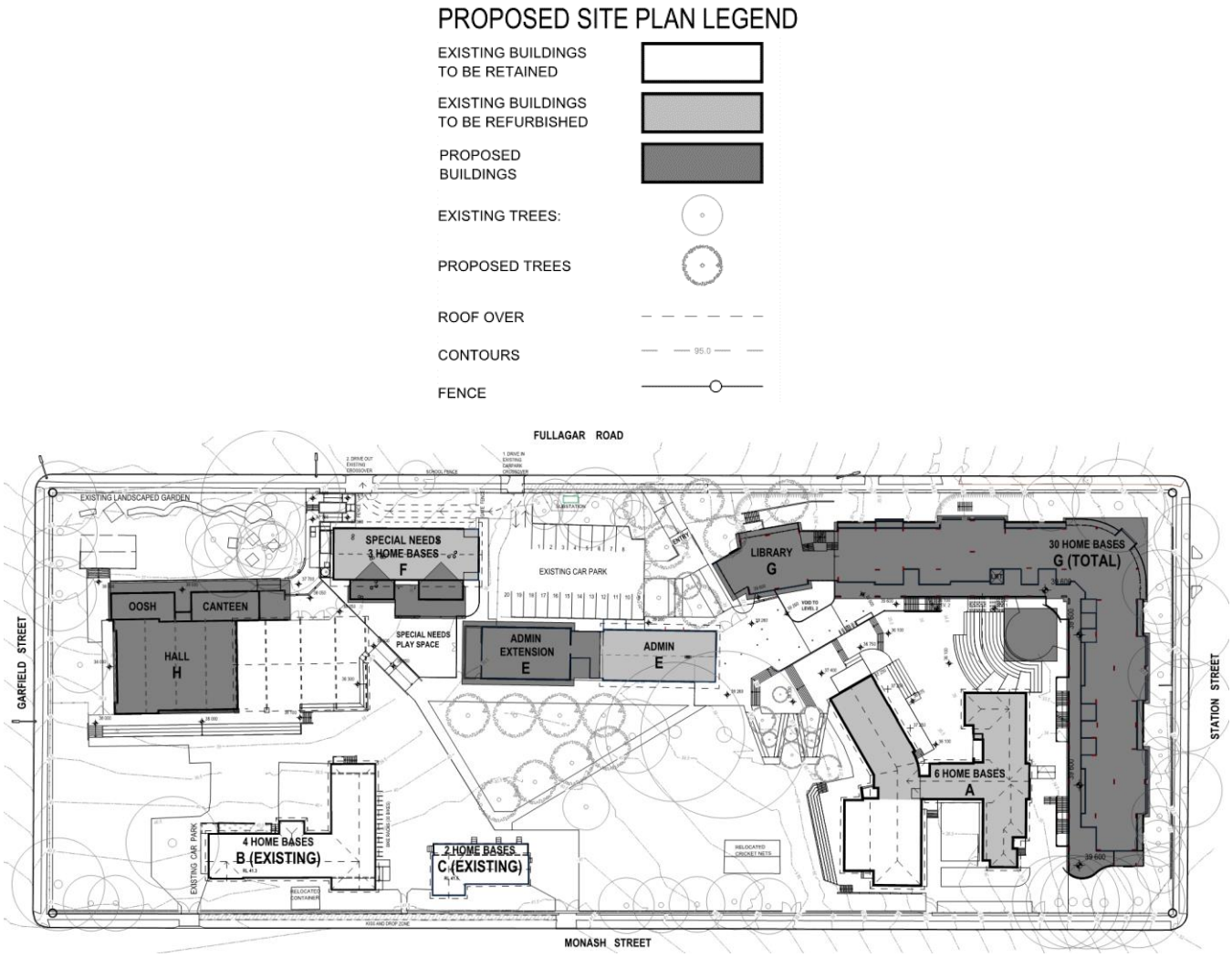

Figure 1: Proposed Site of Works

5. EXISTING SERVICES

5.1 Power

The existing site is supplied by an on-site kiosk substation, located along Fullagar Rd and serves both the school and surrounding residences inclusive of street lighting.

5.1.1 Substation 24106

Asset Number	24106
Type of Asset	Pad-mount Kiosk Substation/Transformer
HV Operating Voltage	11 kV
Location on Site	Refer to electrical services infrastructure plan
Impacts on Infrastructure	The transformer is rated at 500 kVA (695 Amps/phase) and was constructed in 2004. Based on a site inspection of the substation conducted by Northrop's Level 3 Accredited Service Provider (ASP) on Thursday, 7th December 2017, the substation services Wentworthville Public School and above-ground services (including residences and street lighting) along Fullagar Road. Based on observing the switchgear, the existing dedicated supply for the School is rated at 400 Amps/phase. Based on Endeavour Energy's contestable works advice, the supply could be increased should the proposed School's requirements exceed this. Our assessment has been based on the site inspection conducted on 12.10.2017. It was determined from the Maximum Demand Indicators local to the MSB that since the meters were last reset, the maximum demand of the School has been: • 141.2 A on phase A. • 165.8 A on phase B. • 160.1 A on phase C. The instantaneous demand of the School at the time of inspection (12th October 2017, 12:41 PM – BOM data shows the maximum temperature that day was 29.2°C) was: • 67.81 A on phase A. • 47.16 A on phase B. • 65.19 A on phase C. It was noted that air-conditioning was active in some areas that day and would be generally representative of an average load during an average school day.

5.2 Telecommunications

Following the review of the Dial Before You Dig (DBYD) plans and our site inspections, we have identified existing utility telecommunications services in the immediate vicinity of the school. The following is a summary of the surrounding and dedicated infrastructure.

5.2.1 NBN

There are existing NBN Co in-service cable/duct/trench reticulated along Fullagar Rd, with multiple pits located on the school's boundary.

The services are shown below in an extract from the NBN Dial Before You Dig maps.

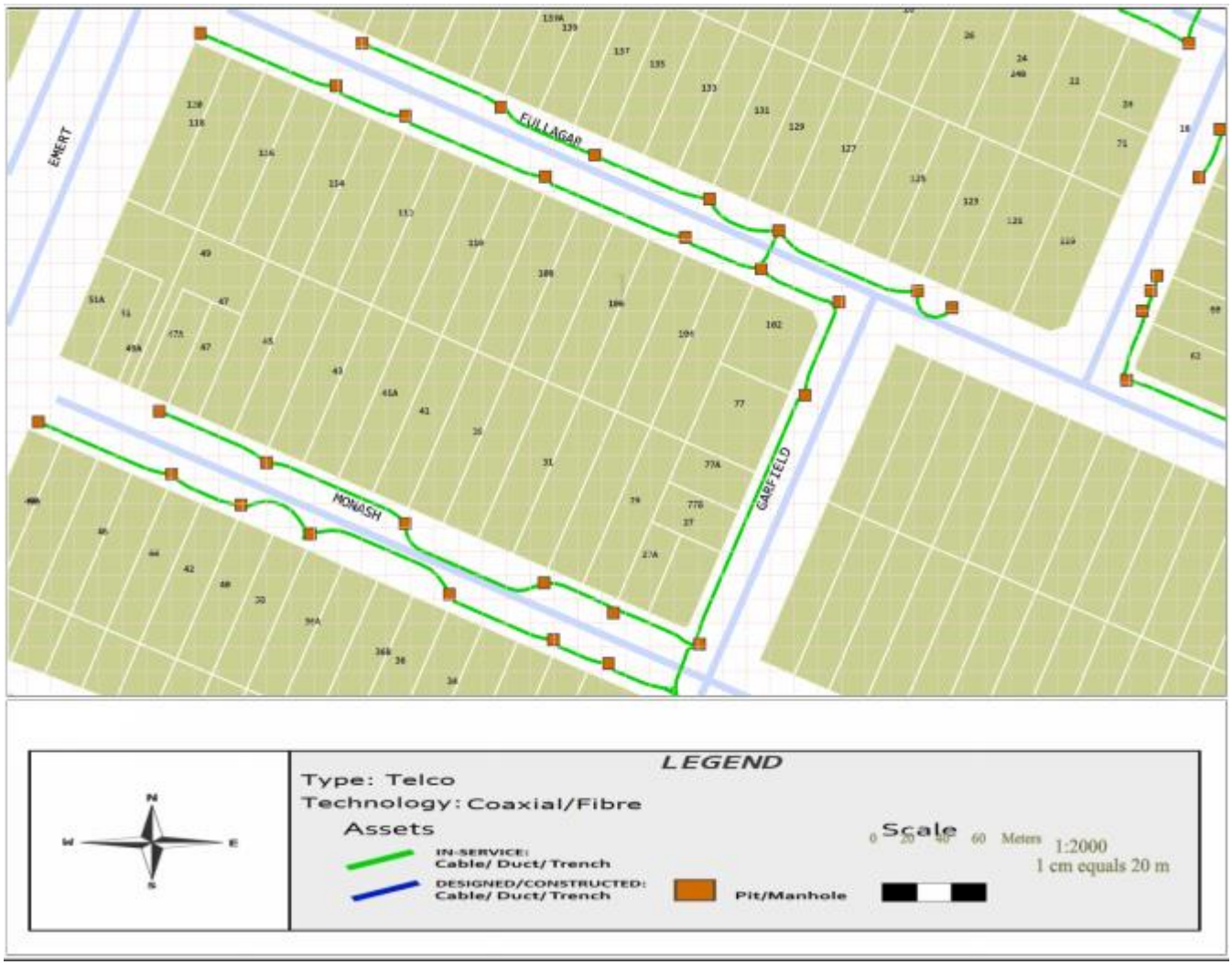

Figure 2: NBN Pit and Conduit Routes

5.2.2 Telstra

A standard Department of Education standard FiberNet Telstra fibre optic network termination device (NTD) is present in the Main Communications Room within the existing school campus.

This incoming service acts as the main telecommunications service for the existing school, with the reticulation indicated on the Electrical services infrastructure plan provided.

5.3 Water

The existing authority's 100mm water mains are located in Fullagar Rd, Garfield St and Monash St with a 150mm main located in Station St. Based on the authority's pressure and flow results and further discussions with Sydney Water the available flows and pressures are very low.

Existing water meters are located of Station St and Monash St with the incoming supply extending from the adjacent authority's main.

5.4 Sewer

The existing authority's 255mm sewer main and the currently 150mm utilised connect are located in the north-eastern corner of the site. The Sydney Water sewer diagram indicates the internal private sewer main serving the site extends to far western side to serve the original older buildings.

5.1 Stormwater

5.1.1 Flooding Context

After reviewing 'Flood Controls Lots Map Former Holroyd', it is concluded that this site is not subject to mainstream flooding.

5.1.2 Existing Sub-Catchments

The surface levels of the school site generally fall in a northerly direction towards Fullagar Road from Monash Street. The existing grades are not considered steep although the grades at the eastern end of the site are somewhat steeper than the western side. There is a ridge line running through the middle of the site resulting in two distinct stormwater surface runoff catchments. The western catchment drains to north western corner of the site and the eastern catchment drains to the north eastern corner.

The site consists of a mixture of impervious surfaces including buildings, carparks, footpaths and paved playground areas, and pervious grassed areas.

From a stormwater management perspective, it is generally preferable to maintain existing catchment areas so as not to place undue strain on any of the existing stormwater infrastructure. Whilst it is likely that the proposed additional accommodation will result in an increase in impervious area, we would still seek to maintain the existing stormwater catchments. There should be no issues from a stormwater catchment perspective locating the new buildings at any location.

5.1.3 Pre-Development Stormwater Management Approach

There are extensive stormwater infrastructure systems within the site.

For the western catchment, we were able to identify what appeared to be two existing inground on-site stormwater detention (OSD) tanks. One tank is located at the western end of the recently constructed building (circa 2005) fronting Fullagar Road. This tank is a concrete tank and appears to drain to the west. There is also evidence of an in-ground detention tank located beneath the grassed area at the western end of the site fronting Garfield Street. This was evidenced by four pits located in a square pattern in this area. It is likely that this tank is a non-accessible modular system such as an Atlantis system. This tank appears to drain to the north towards Fullagar Road.

Based on the direction of the outlet pipes from these tanks, it appears that the both these tanks converge to a pit located in the north west corner of the site that in turn drains to an existing Council stormwater pit located in Fullagar Road.

For the eastern catchment, we were unable to identify any in-ground tanks that would be acting as on-site stormwater detention (OSD) tanks. There are pits and pipes that appear to drain in a north easterly direction but there is no visible evidence as to where this stormwater system connects to the existing Council stormwater system. Based on the locations of the pits and the direction of the pipes and the overall topography, it is likely that the stormwater system discharges to an existing pit located on Fullagar Road at the north eastern corner of the site.

5.1.4 Pre-Development Hydrologic and Hydraulic Performance

The modular OSD in the western catchment has an approximate volume of 400 cubic metres, which is sufficiently sized for the entire western catchment.

5.2 Gas

The development is currently served by connection and meter assemblies located at the Monash St boundary. Both supplies appear to be connected to 50mm 210kpa authorities main in Monash St.

6. PROPOSED INFRASTRUCTURE & AUGMENTATION

6.1 Power

Northrop has undertaken a preliminary assessment of the load requirements for the proposed development. Preliminary load assessment calculations according to AS/NZS 3000:2007 Table C3 have indicated that total load at completion of the works in the order of 756.5A (524kVA).

A connection of load request was submitted to Endeavour Energy with the official response confirming that an upgraded substation will be required. The existing substation is rated at a maximum of 500kVA, lower than the proposed demand, and it is noted that the existing LV connection is insufficient for the proposed load.

A detailed ASP3 design will be developed via a method of supply submission to Endeavour Energy to accommodate the increased load.

The calculated maximum demand for the school has been included within Appendix D.

6.2 Telecommunications

The existing FibreNet incoming infrastructure is proposed to be retained as part of these works. The incoming fibre will be re-routed in coordination with Telstra to suit the new school entrance pathways with relocation of several pits within the site.

The main termination will still be located at the Main Communications Room within the Administration building E.

6.3 Water

6.3.1 Water Supply Demand

Based on an illustrated fixtures it is estimated that the overall load unit (LU) demand for each building is as follows:

- New buildings:
  - Block G – 177 LU
  - Block H – 37 LU
- Refurbished buildings
  - Block F – 27 LU (increased to)
- Reconfigured buildings
  - Block E - 39 LU (increased to)
  - Block A – 28 LU (increase of)

Fire hydrant demand of 20l/s will be required to provide a compliant installation.

6.3.2 Water Connection

A new incoming water supply will be required to replace the water supply from Station St to accommodate the increased demand and fire hydrant requirements. A water meter assembly and fire hydrant booster assembly will be located to meet aesthetic and compliance requirements.

Due to the issues with the pressure and flows in the authority's mains cold water pumps will be required to serve Block G and possibly other buildings. A fire hydrant tank and pumps will be required to provide a compliant fire hydrant system. The intent is to extend the new fire hydrant system to provide coverage to existing buildings.

Water supply for the new buildings will generally be extended from the meter assemblies due to the unknown size of the inground services and the current demand off the existing system. Refurbished and reconfigured buildings will likely utilise the existing supply to the building, particularly if there is minimal changed to current loads.

6.4 Sewer

6.4.1 Sewer Discharge Demand

Based on an illustrated fixtures it is estimated that the overall fixture unit (FU) load for each building is as follows:

- New buildings:
  - Block G – 205 FU
  - Block H – 61 FU
- Refurbished buildings
  - Block F – 35 FU (increased to)
- Reconfigured buildings
  - Block E – 45 FU (increased to)
  - Block A – 34 FU (increase of)

6.4.2 Sewer Connection

Based on the understanding the existing system and the proposed new fixtures the authority's main and current connection appears to be adequate. Each building will connect to nearest 100mm sewer which is general adjacent or nearby to each building.

6.5 Stormwater

6.5.1 Proposed Stormwater Management Approach

The drainage system for the proposed development will be designed to collect all concentrated flows form the impermeable surfaces such as roof areas, decks and walkways. The proposed drainage system for the eastern catchment consists of a network of piped drainage system to collect runoff from the developed area and drained into an On-Site Detention (OSD) tank. The OSD has been sized in accordance with Upper Parramatta River Catchment Trust handbook and will require a volume of 212.71m^3. The existing modular detention unit in the western catchment will be demolished and reconstructed as a concrete detention basin with the same volume.

6.5.2 On-Site Detention

As discussed above, an OSD will be required. As per the Upper Parramatta River Catchment Trust handbook the OSD has been sized to a volume of 212.71m^3.

6.5.3 Proposed Infrastructure

The proposed stormwater infrastructure consists of a series of conventional pit & pipe system with three OSDs. The OSD located in the under croft outdoor learning area in the eastern catchment has a volume of 212.71 cubic metres, and the two OSD in the western catchment are to be retained with the modular OSD to be re-constructed as a concrete tank with the same volume

6.5.3.1 Building Connections

Roof rainwater will be collected by eave gutter and conveyed by downpipes to connect to the proposed stormwater system.

6.5.4 DRAINS Modelling

DRAINS modelling is not required for development sites located in upper Parramatta river catchment.

6.5.4.1 Post-Development Stormwater Performance

The proposed OSD for the eastern catchment is sized in accordance with UPRCT requirements, and it has been confirmed that the existing modular OSD system (to be reconstructed as concrete in-ground tank) has sufficient storage for the entire western catchment. Calculations showed the primary outlet had a discharge rate of 16.19L/s and 53.38L/s from the secondary outlet.

6.6 Gas

6.6.1 Gas Demand

Based on an assumed number of gas hot water units and gas space heaters it is estimated that the overall gas demand for each building is as follows:

- New buildings:
  - Block G – 2,400 MJ
  - Block H – 610 MJ
- Refurbished buildings
  - Block F – 735 MJ
- Reconfigured buildings
  - Block E – 245 MJ (increase of)
  - Block A – 240 MJ (reduced to)

6.6.2 Gas Connections

Both existing gas supplies and meter assemblies will be utilised to supply all new works. The assemblies will be required to be upgraded, whilst the incoming supply and authorities should be suitable for the increased demand.

Gas supply for the new buildings will generally be extended from the meter assemblies due to the unknown size of the inground services and the current demand off the existing system. Refurbished and reconfigured buildings will likely utilise the existing supply to the building, particularly if there is minimal changed to current loads.

APPENDIX A: SCHOOL POPULATION

- Existing Student Numbers = 604 students
- Proposed Student Numbers = 1000 students
- Existing Staff Numbers = 60 staff
- Proposed Staff Numbers = 80 staff

a) Existing Classroom Spaces in Permanent Facilities = 14
b) Existing Classroom Spaces in Demountables = 22
c) Total Existing Classroom Spaces (a+b) = 36
d) Total number of Classroom Spaces to be demolished/repurposed = 8
e) Total number of permanent Classroom Spaces to be constructed or refurbished = 39
f) Net No. of New Permanent Classroom Spaces (e-d) = 31
g) Final No. of Total Teaching Spaces on Site (a + f) = 45

APPENDIX B: PRELIMINARY MAXIMUM ELECTRICAL DEMAND CALCULATION

NON-DOMESTIC MAXIMUM DEMAND CALCULATION

Wentworthville Public School
CALCULATION IN ACCORDANCE WITH
AS/NZS 3000 - 2007 TABLE C3

Job No: SY171537
Date: 25.06.18
Scope:

Dist. Group	Load Description	Area (m^2)	Load per m^2 (VA)	Load for whole area (kVA)	Load (A/Phase)
Block A - Ground	Homebases	615	80	49.2	71.0
	Withdrawal	52	80	4.16	6.0
	Practical Activities Area	456	80	36.48	52.7
	Store	15	5	0.075	0.1
	Toilets	30	15	0.45	0.6
Block E - Ground	Staff Room	145	80	11.6	16.7
	Annex	49	80	3.92	5.7
	Store	20	5	0.1	0.1
	Interview Room	30	80	2.4	3.5
	Principals Office	17	80	1.36	2.0
	Deputy Offices	53	80	4.24	6.1
	Toilets	25	15	0.375	0.5
	Printing	22	80	1.76	2.5
	First Aid	10	80	0.8	1.2
	Clerical	48	80	3.84	5.5
	Plant	4	40	0.16	0.2
	Entry	31	50	1.55	2.2
Block F - Lvl 1	Homebases	204	80	16.32	23.6
	Withdrawal	43	80	3.44	5.0
	Practical Activities Area	120	80	9.6	13.9
	Sens. Room	17	80	1.36	2.0
	Kitchen/Laundry	20	160	3.2	4.6
	Circulation	40	40	1.6	2.3
	Store	9	5	0.045	0.1
	Toilets	40	15	0.6	0.9
Block G - Lvl 1	Homebases	406	80	32.48	46.9
	Practical Activities Area	126	80	10.08	14.5
	Withdrawal	42	80	3.36	4.8
	Toilets	145	15	2.175	3.1
	Store	8	5	0.04	0.1
	BCR	9	60	0.54	0.8
		0		0	0.0
Block G - Lvl 2	Homebases	810	80	64.8	93.5
	Practical Activities Area	226	80	18.08	26.1
	Store	28	5	0.14	0.2
	Withdrawal	87	80	6.96	10.0

	Toilets	10	15	0.15	0.2
	ICT	64	140	8.96	12.9
	Community Hub	22	80	1.76	2.5
	ELAD/LST	42	80	3.36	4.8
	Circulation	72	40	2.88	4.2
	BCR	9	60	0.54	0.8
Block G - Lvl 3	Study	274	80	21.92	31.6
	Office	43	80	3.44	5.0
	Seminar Room	24	80	1.92	2.8
	Store	18	5	0.09	0.1
	Circulation	10	6	0.06	0.1
	Resource Centre	20	80	1.6	2.3
	Withdrawal	84	80	6.72	9.7
	Homebases	752	80	60.16	86.8
	Practical Activities Area	238	80	19.04	27.5
	BCR	9	60	0.54	0.8
	Toilets	45	15	0.675	1.0
Block H - Ground	OOSH	44	80	3.52	5.1
	Hall	371	40	14.84	21.4
	Stage+Sound Cupboard	47	150	7.05	10.2
	Toilets/Shower	46	15	0.69	1.0
	Canteen	53	160	8.48	12.2
	Office	26	80	2.08	3.0
	Store/Uniform Cupboard	51	5	0.255	0.4
	BCR	9	60	0.54	0.8
Block B, C	Existing Buildings	711	50	35.55	51.312005
3 - Phase	1 x 40A 3 Phase for Lift			20	28.9
	Totals	**7096.0**		**524.1**	**756.5**
			Spare Capacity		0%
			AS3000 Maximum Demand (Non-Domestic, Design Spare Capacity)		**756.5 Amps/ Phase**

APPENDIX C: ENDEAVOUR ENERGY CORRESPONDENCE

APPENDIX D: UPRCT CALCULATION SHEET