NJM DESIGN

Building Services Masterplan

Project Name:	Wild Cherry Steiner School Lot A, 1738 Princes Hwy Johnsonville
Job Number:	7895
Date:	11/04/2023
Client:	Wild Cherry Steiner School
Revision	02

Revision	Issue Date	Document Control	
01	11/02/2023	Prepared by: John Maroulis	Approved by: John Maroulis
02	11/04/2023	Prepared by: John Maroulis	Approved by: John Maroulis
		Prepared by:	Approved by:

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1 INTRODUCTION

NJM Design has been engaged to prepare a services report based on the master plan for the Wild Cherry Steiner School in Johnsonville prepared by Mark Simnett Building Design.

The School operator is undertaking a masterplan study with a view of staging the construction of facilities for students on the site. As such, this report will provide a guide as to the upgrades required to the various services in order to accommodate the additional buildings and occupants.

The school site is currently an empty, greenfield site which has been newly created as part of a subdivision.

The masterplan in Appendix 1 indicates that 11 buildings will be established on the site. These will include building 1 which will be an early learning centre (ELC), an administration block, three buildings for the primary age years (including general classrooms, library and hall), 6 buildings for the secondary age years (including senior common rooms, science and trade rooms) and a maintenance shed.

In developing this report, we have taken into consideration the following documents and requirements:

- Building Code of Australia and relevant Australian Standards
- Our site and desktop inspection of various existing infrastructure services to the site
- Discussions with client's representatives.

It is the operator's intent to build the school using natural materials and create a natural bush setting for the school with plenty of ESD initiatives built into the design.

This report describes the infrastructure currently serving the site for the following engineering services.

- Electrical services including power supply and communications systems.
- Hydraulics services including sewer and potable water reticulation.
- Stormwater reticulation

The report is based on the school being established in three stages, being:

- Stage 1 – Admin building and maintenance shed
- Stage 2 – ELC
- Stage 3 – Building 3 class rooms
- Stage 4 – Building 4 – Hall
- Stage 5 – Building 5 class rooms
- Stage 6 – Senior school buildings
- Stage 7 – Library addition

The report suggests options regarding timing to upgrade the existing services to best serve the proposed future use of the site.

2 MASTERPLAN AND STAGING

2.1 GENERAL

The school Masterplan has been prepared by Mark Simnett Building Design and the proposed construction staging plan is shown in Appendix 1 of this report.

The Masterplan contains the following buildings and stages:

Stage No.	Building Type	Population Increase	Status
1	Admin	20	Proposed
2	ELC	90	Proposed
3	Building 3 class rooms	80	Proposed
4	Building 4 hall	Nil	Proposed
5	Building 5 class rooms	70	Proposed
6	Senior school buildings	180	Proposed
7	Library	Nil	Proposed
Final	-	440	-

Table 2.1 – Staging and Population Increase

Based on the above staging plan and population increases, NJM Design will review the building services infrastructure requirements for the site. Based on this review, we shall nominate the services connections to the site, infrastructure required at the site and the associated costs for these services.

2.2 SERVICES TO BE REVIEWED

As part of this masterplan review, NJM Design shall review the requirements of the school for the following services:

- Electrical power supply
- Potable water supply
- Sanitary drainage
- Stormwater drainage
- Fire protection services
- Mechanical services

Note that fire protection services have not been reviewed as part of this report on the basis that none of the buildings will be larger than 500m in area. Hence, fire hydrant and fire hose reel protection is not required for these building as per the requirements of the Building Code of Australia. However, a CFA fire system is proposed on the basis of a BAL19 rating for the site/proposed buildings.

2.3 SERVICES PROVIDED TO THE SITE

The proposed school site is a new lot created as part of a residential sub-division of a farm. The civil drawings/design prepared for this subdivision indicate that the following infrastructure is being provided to the site and in particular to the school lot, Lot A.

- A 250mm diameter stormwater drain running across the south boundary of the site and discharging to the creek. No connection to Lot A.
- A 100mm diameter water main in Caldwell Crt with a 20mm connection to Lot A.
- Telecom cabling in Caldwell Crt
- A 150mm diameter sewer main along the south boundary of the site terminating at the school entry. No connection to the school but pit/inspection opening provided.
- Electrical cabling in Caldwell Crt with 63A supply to the school.

3 ELECTRICAL POWER SUPPLY

3.1 EXISTING INFRASTRUCTURE

The site of the school is within the Ausnet electricity distribution area.

As part of the new estate, the developer is installing underground power services to each lot. The school site is allocated a 63A low voltage supply. This is the legal requirement on the estate developer but this will be insufficient for the school.

3.2 EXISTING CONNECTION

The school lot is provided with a 63A three phase low voltage supply.

3.3 FUTURE ELECTRICITY REQUIREMENTS

Based on the masterplan and staging plan, we have estimated the electrical load of the site for each stage. This is shown in table 2.2. Also nominated in this table are options for the electrical power supply method.

It should be noted that the school intends to install substantial solar PV panels to generate onsite electricity. However, the supply cable needs to be sized for the winter peak when electricity demand for heating is at its highest and the solar generation is at its lowest.

Stage No.	Electrical Load of Stage (A)	Total Electrical Load (A)	Electrical Supply Method – Option 1	Electrical Supply Method – Option 2
1	40	40	Low voltage cable	Low voltage cable
2	80	120	Low voltage cable	Low voltage cable
3	45	165	Low voltage cable	Low voltage cable
4	30	195	Low voltage cable	500 kVA subst/n
5	45	240	500 kVA subst/n	500 kVA subst/n
6	85	325	500 kVA subst/n	500 kVA subst/n
7	15	340	500 kVA subst/n	500kVA subst/n

Table 3.1 – Electrical supply options

From the above table, the supply to the school needs to be upgraded for Stage 1 and the method of supply needs to be upgraded after stage 5 due to the increasing electrical load. The point at which this upgrade needs to occur is dependent on:

a) The school electrical load
b) The available means of supplying the increased load, and
c) The rate at which housing is built on the estate

From table 2.2 above, the school can be supplied by a low voltage cable for Stages 1-3. For stage 4, the supply can either be an upgraded low voltage cable or a substation on site (this will be dependent on the supply available as houses are constructed). For stage 5, the school will require its own substation.

By minimising the changes to the method of supply, costs are reduced as Ausnet will only have to do major works after stage 5.

The cost of upgrading the electrical power supply can be further contained by:

- Locating the main switchboard in an optimal location.
- Building the MSB with adequate capacity to cater for the ultimate load of the school.
- Building the MSB so that it can be expanded via 'bolt-on' segments as the school expands.
- Installing adequate conduits from the substation location to the main switchboard at stage 1 so that extra cables can be installed without additional trenching as the school grows.
- Installing all necessary conduits and pits from the main switchboard location to strategic pit locations to cater for expansion without additional trenching.

The preferred optimum locations for the substation and main switchboard are shown on the electrical location layout plan in Appendix 2. Also shown are the suggested works to be undertaken at each stage to accommodate future stages without requiring trenching through established areas.

The costs associated with the power supply upgrade for each stage, including fees payable to Ausnet, main switchboard works, cable installation between the substation and the main switchboard as well as infrastructure works to accommodate future stages are summarised in the table below.

Stage No.	Ausnet Costs	MSB Upgrade Costs	Site Upgrade Works Costs	Total Stage Costs
1	-	N/A	N/A	-
2	$40,000	$10,000	$20,000	**$70,000**
3	-	N/A	N/A	-
4	-	N/A	N/A	-
5	$60,000	$20,000	N/A	**$80,000**
6	-	N/A	$60,000	**$60,000**
7	-	N/A	N/A	-

Table 3.2 – Electrical Infrastructure Costs

Notes

1. The costs payable to Ausnet at stage 2 are for the provision of a larger low voltage supply than the one provided by the developer.
2. The costs payable to Ausnet at stage 5 are for the provision of a kiosk substation which is larger than required at that stage. Therefore, the client will pay a higher proportion of the actual substation cost. We have assumed that the substation will be required at Stage 5 assuming that all house lots have been built.
3. All costs are in today's dollars and exclude GST. They include trenching and basic re-instatement.

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4 HYDRAULIC SERVICES

4.1 EXISTING INFRASTRUCTURE

The site is surrounded by a housing estates and the developer has installed substantial water and sewage infrastructure in the vicinity. This includes:

- A 150mm diameter sewer main in Caldwell Crt.
- A 100mm water main in Caldwell Crt.
- A 225mm diameter stormwater drain along the south side of the property.

This infrastructure has substantial capacity and can be used to service the school without major extensions or upgrades being required by the water authority.

4.2 EXISTING CONNECTION

The school has a 25mm water connection and a 100mm sewer branch. There is no connection to the stormwater drain but there is a pit along the south boundary for future connection to the main drain.

4.3 FUTURE WATER AND SEWAGE REQUIREMENTS

Based on the masterplan and staging plan, the existing water and sewer connections can be retained and there will not be a need to upgrade these connections for stage 1.

4.3.1 Sewer Requirements

The school will require a 150mm sewer branch to cater for the Stage 2 works. This can be done at that stage. It should also be noted that as some of the Primary level buildings are to be built quite low on the site, a sewer pit and pump maybe required. This will need to be established when detailed working drawings are developed.

4.3.2 Water Requirements

The water reticulation for the school is shown in Appendix 5.

The water meter will need to be replaced and upgraded as follows:

At Stage 1 25mm water supply

At Stage 2 Upgrade from 25mm to 40mm water meter

In addition to the costs associated with the upgrade of the water meters, the water authority will charge fees to cater for the increased use of its assets based on the increased school population.

The cost of the water and sewer reticulation works as well as the fees are tabulated below.

Stage No.	CWW Costs	Water Upgrade Costs	Sewer Upgrade Costs	Total Stage Costs
1	$5,000	N/A	N/A	**$5,000**
2	$5,000	$5,000	$15,000	**$25,000**
3	$5,000	N/A	N/A	**$5,000**
4	$5,000	N/A	N/A	**$5,000**
5	$5,000	N/A	N/A	**$5,000**
6	$5,000	N/A	N/A	**$5,000**

7	-	-	-	-

Table 4.1 – Hydraulic Infrastructure Costs

Notes

1. The costs payable to the water authority at stages 1, 2 and 3 are for the extra load on their system.
2. All costs are in today's dollars and exclude GST. They include trenching and basic re-instatement.

4.4 Stormwater Drainage

The school will install a number of rainwater tanks and possible pond on the site. Rainwater will be re-used for toilet flushing and irrigation.

In any case, a stormwater connection needs to be made to the stormwater drain along the southern boundary. There are no fees to be paid to make this connection.

4.5 Fire Protection Services

The current masterplan design does not include any buildings which have a floor area greater than 500m². Therefore, none of the buildings requires a fire protection system in accordance with the requirements of the BCA and AS2419. As a result, a fire hydrant and hose reel system connected to the water mains is not required.

However, the site is likely to have a BAL rating of BAL19. It is likely that the CFA will request on-site water storage and a number of on-site hydrants connected to this water storage facility. We recommend that a 10,000L water tank be installed at the top of the site and connected to a number of hydrants located around the site. This arrangement will allow the fire brigade to assist in case of bushfire or grass fire near the site.

The cost of the tank will be in the order of $20,000 with a hydrant needed at stages 1, 2, 3, 5 and 6. The cost of the hydrant pipework will be in the order of $30,000 per stage.

5 MECHANICAL SERVICES

5.1 VENTILATION

In keeping with the school's philosophy, it is envisaged that all fresh air requirements for the school will be provided via natural ventilation. Therefore, no allowance will be made for ducted fresh air to any building.

Toilet exhaust will be provided via ducted, mechanical exhaust systems.

5.2 AIR CONDITIONING

Air conditioning to all occupied spaces shall be provided by reverse cycle AC units. The classrooms will be served by either wall mounted units or cassette units depending on the thermal load.

6 CONCLUSION

6.1 GENERAL

The proposed works at the school will require upgrades to electrical and hydraulics services.

The cost of the major services upgrades for each stage are summarised below. These costs only include works to get the services to/from the site. They do not include costs for services within the site or buildings.

6.2 COSTS

The costs of the supply upgrades and connection of services to the proposed buildings are tabulated below.

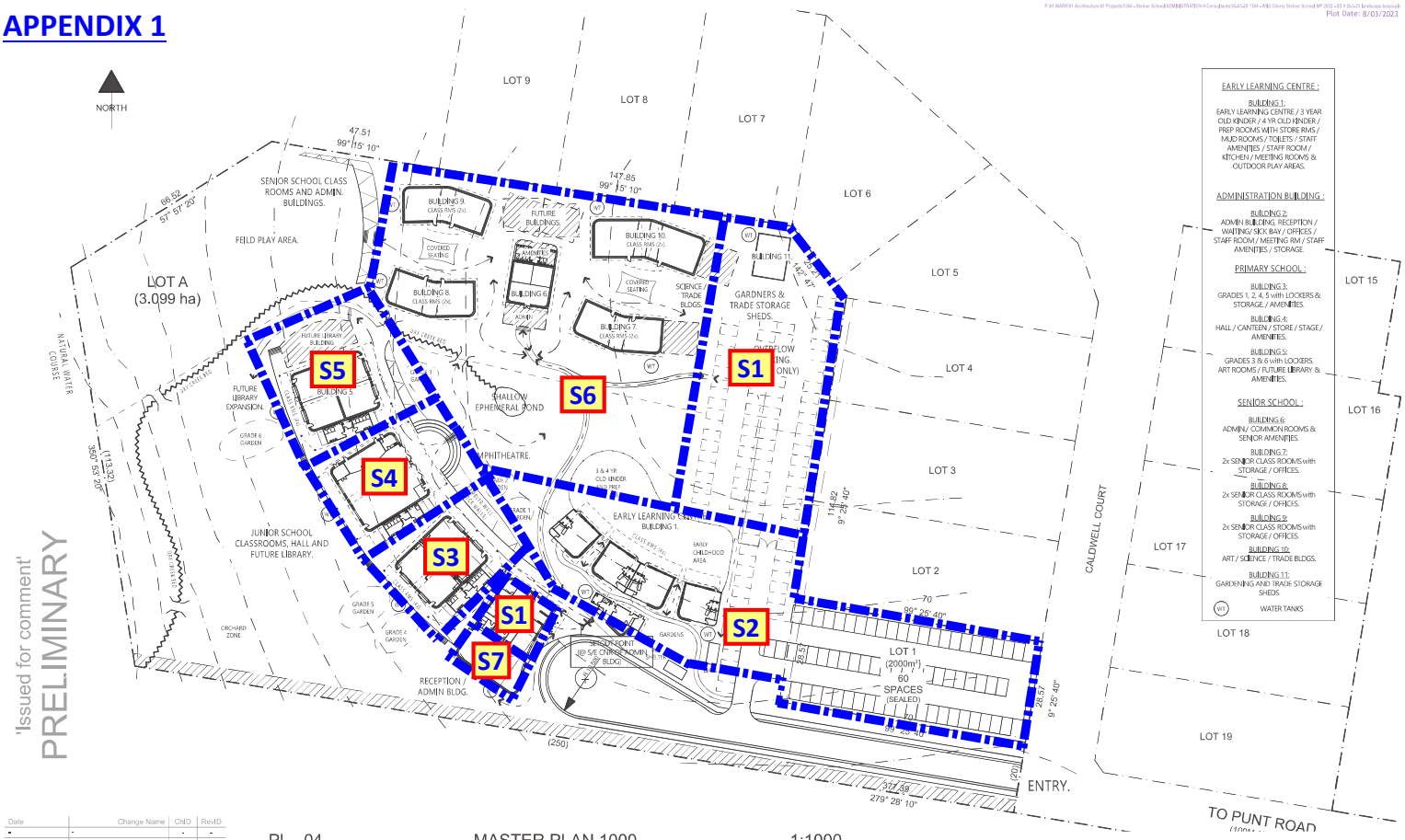
Stage	Electrical	Hydraulics	Fire	Total
1	-	$5,000	$20,000	$25,000
2	$70,000	$25,000	-	$95,000
3	-	$5,000	-	$5,000
4	-	$5,000	-	$5,000
5	$80,000	$5,000	-	$85,000
6	$60,000	$5,000	-	$65,000
7	-	$5,000	-	$5,000
Total	$210,000	$50,000	$20,000	**$280,000**

Table 6.1 – Infrastructure Upgrade Costs

7 APPENDICES

1. Master Plan and Staging
2. Electrical Master Plan
3. Hydraulics Master Plan

APPENDIX 1



'Issued for comment'
PRELIMINARY

Date	Change Name	CND	RevID
-	-	-	-

PL - 04 MASTER PLAN 1000 1:1000

7895 -SK01 - STAGING PLAN

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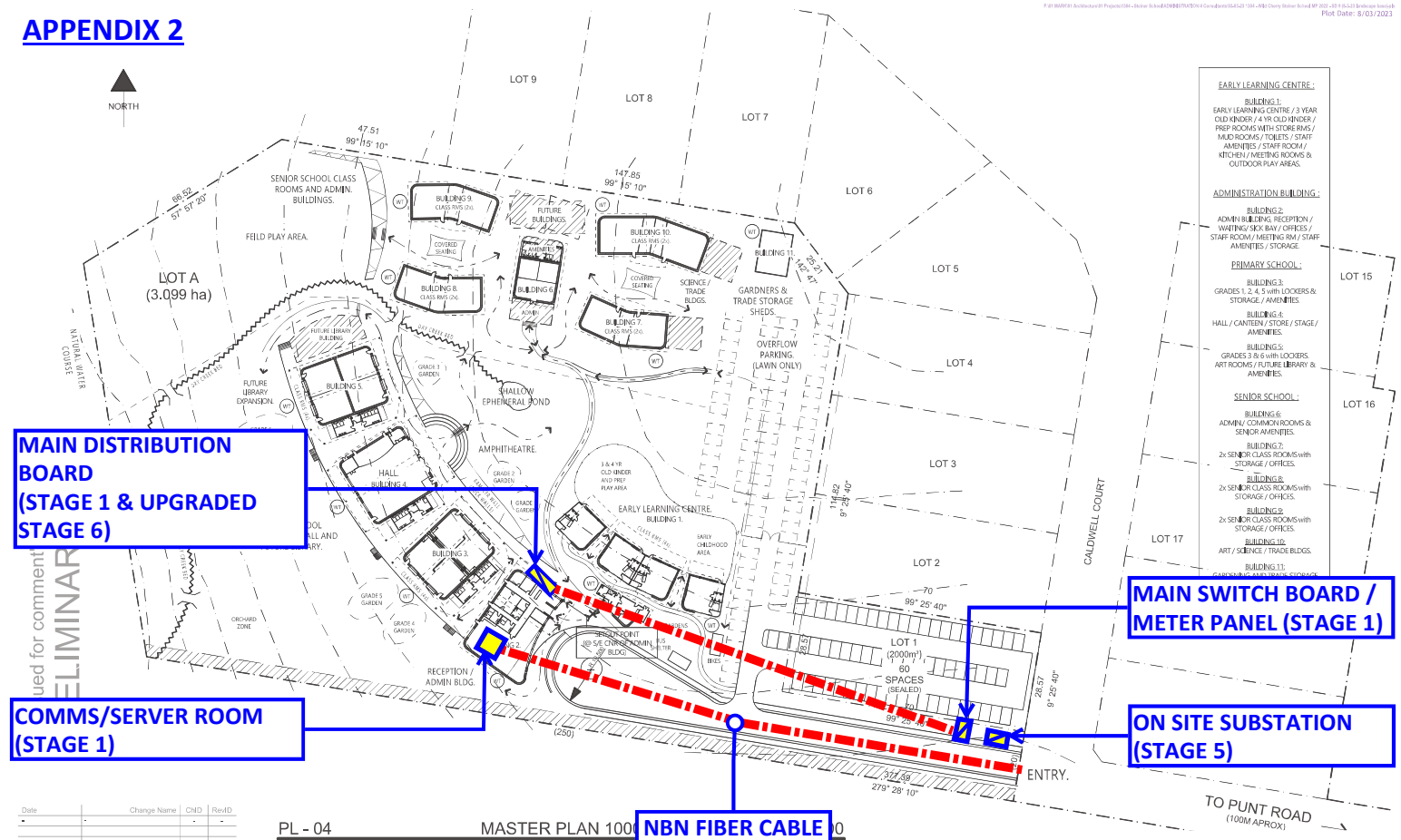
North

PROJECT: Wild Cherry Steiner School Development
ADDRESS: Lot A / 1738 Princes Hwy - Johnsonville

MASTER PLAN SITE 1000 (A3)
Designed & Documented by: Mark Simnett
SCALE: As Noted
PLOT DATE: 8/03/2023
1304 MP - 07

APPENDIX 2



MAIN DISTRIBUTION BOARD (STAGE 1 & UPGRADED STAGE 6)

MAIN SWITCH BOARD / METER PANEL (STAGE 1)

COMMS/SERVER ROOM (STAGE 1)

ON SITE SUBSTATION (STAGE 5)

NBN FIBER CABLE (STAGE 1)

Date	Change Name	CND	RevID
-	-	-	-

PL - 04 MASTER PLAN 1000

7895 -SK02 - ELECTRICAL PLAN

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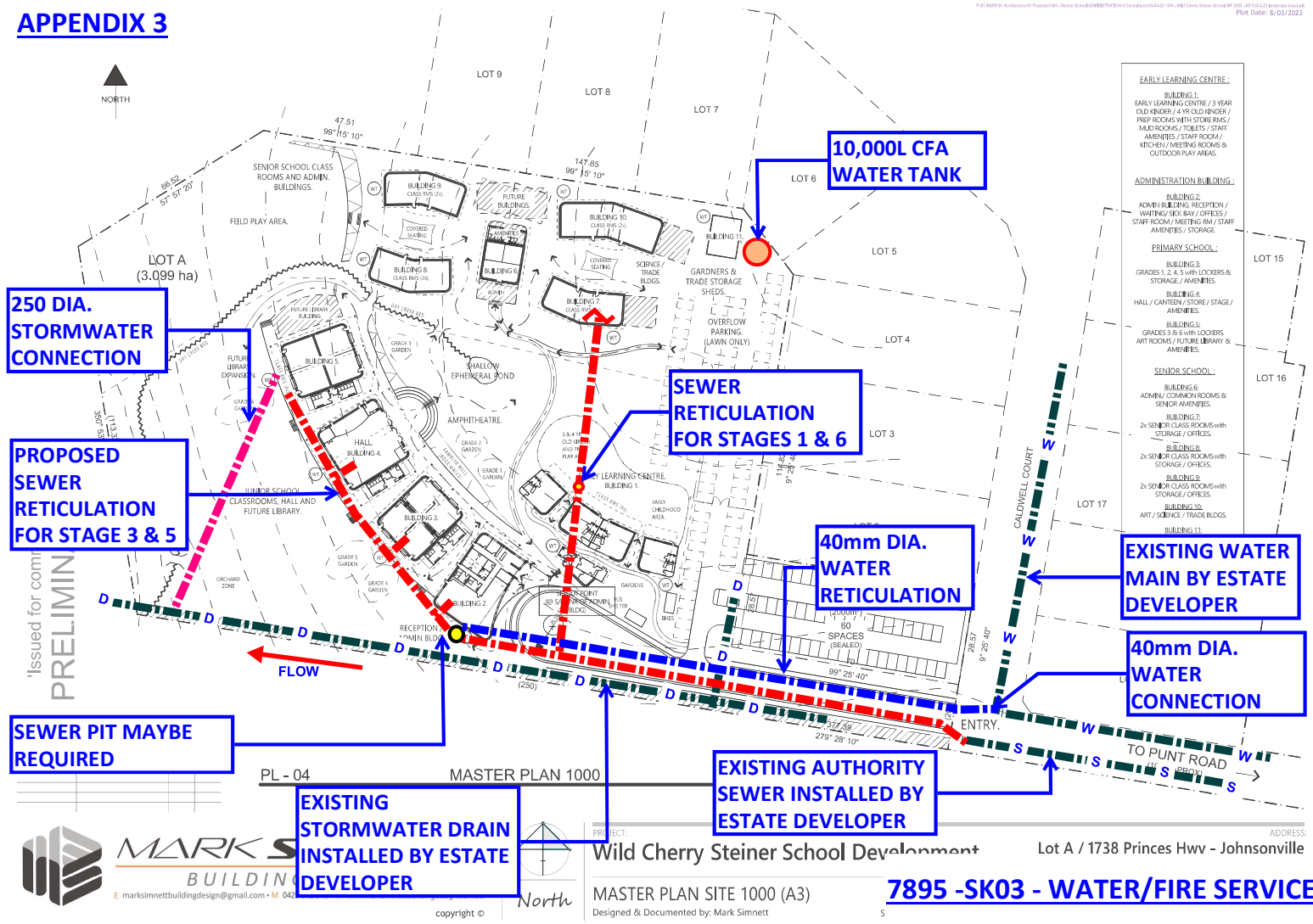
APPENDIX 3



PL - 04 MASTER PLAN 1000

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MASTER PLAN SITE 1000 (A3)
Designed & Documented by: Mark Simnett

7895 -SK03 - WATER/FIRE SERVICES