Assyrian Schools Limited

# Flood Management Assessment – Lots 2320 and 2321 in DP 1223137, 17-19 Kosovich Place, Cecil Park, NSW

martens consulting engineers

ENVIRONMENTAL

WATER

WASTEWATER

GEOTECHNICAL

CIVIL

PROJECT MANAGEMENT

P1705798JR04V05
October 2018

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**All enquiries regarding this project are to be directed to the Project Manager.**

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# 1 Introduction

## 1.1 Overview

This report documents the findings of a desktop flooding assessment completed to support a state significant development application (SSDA) for a proposed development located at Lots 2320 and 2321 in DP 1223137, 17 and 19 Kosovich Place, Cecil Park, NSW (the 'site'). This report has been prepared in accordance with the agreed scope of work.

This report should be read in conjunction with the Riparian Zone Management Assessment.

## 1.2 Objectives

The assessment objectives include:

- Review of Fairfield City Council's *Rural Area Flood Study: Ropes, Reedy & Eastern Creeks Final Report* (BMT WBM, November 2013) to confirm mapped flood extents of the 1 in 20 year ARI, 1 in 100 year ARI and PMF events.
- Review of flooding requirements in Fairfield City Council's Development Control Plan 2013 (September 2018) and review of compliance of the proposed development.
- To assess development compliance in accordance with Fairfield City Council's flood requirements in DCP 2013.

## 1.3 Proposed Development

Preliminary plans and sections prepared by PMDL (drawing no. DA101 and DA102, project no. 2639, dated July 2018) and the project brief indicates that the development will include:

- A new primary school with associated library, administration and amenities in a combination of one-storey and two-storey permanent buildings.
- New kiss and drop zone and Staff car park.
- Earthworks, including an approximate maximum of 5 m cut and 3 m of fill for the primary school buildings, access and car parking. Regraded site levels in the vicinity of the school buildings, access and car parking will be between approximately 95.0 mAHD and 98.0 mAHD. Site access to the car park from Kosovich Place is proposed to be at a height of 97.8 mAHD.

- Development works shall include a minor amount of fill (approximately 15 $m^3$, shown in blue on site plan P1705798PS04-K100 in Attachment A) and cut (approximately 17 $m^3$, shown in red on site plan P1705798PS04-K100 in Attachment A)) below the 1 in 100 year ARI site flood level. This volume approximately balances and is not anticipated to have a significant impact on existing flood conditions on site, upstream or downstream of the site.

## 1.4 Relevant Studies, Guidelines and Policies

Studies, guidelines and policies considered pertinent to this assessment include:

- Fairfield City Council (September 2018) *Development Control Plan 2013: Amendment 16* ('Fairfield DCP').
- BMT WBM (November 2013) *Rural Area Flood Study: Ropes, Reedy & Eastern Creeks Final Report*.
- Fairfield City Council (July 2016) *Notice of Determination of Development Application No. 51.1/2016*.

## 1.5 Existing 88b Instrument – Restriction on Use of Land

The development consent (DA 51.1/2016) for the subdivision of Lot 2317 DP 1201268, which created Lots 2320 and 2321 DP 1223137 included in Condition 21 a restriction on the use of Lot 2321 to the effect that:

> *"No development within the meaning of the Environmental Planning Assessment Act 1979, as amended, shall be effected upon the lot hereby burdened unless the unauthorised fill, potential contamination and flooding issues have been determined and resolved and satisfactory arrangements have been made with the relevant service authorities for the provision of water supply, electricity and telephone"*.

The Council of the City of Fairfield is empowered to release, vary or modify the above restriction covenant without consent provided that any such action be made and done in all respects at the cost and expense of the person(s) requesting such release, variation or modification.

This covenant may potentially impact on flood management works, should they be required on Lot 2321.

The site earthworks are designed to mitigate any potential flood impacts on the development, whilst also preventing any adverse flooding effects

(notably increased levels, velocity, *etc.*) on adjoining property from the loss of floodplain storage.

## 1.6 Site Description

General site details are summarised in Table 1.

**Table 1**: General site description summary.

| Element | Description/Detail |
|---|---|
| Lot / DP | Lots 2320 and 2321 in DP 1223137 |
| Local Government Area (LGA) | Fairfield City Council |
| Site Area | Approximately 2.935 ha |
| Existing site development | Predominantly open grassland and former market gardens. |
| Neighbouring environment | The site is surrounded mostly by rural properties. Western Sydney Parklands adjoins the site along its southern boundary. The western boundary is adjacent to a dam that flows into an unnamed tributary. The northern boundary is adjacent to Kosovich Place.<br>An existing church is located on the lot to the north of the site. |
| Expected Geology | Bringelly Shale comprising shale, carbonaceous claystone, claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff (*Penrith 1:100 000 Geological Sheet 9030, 1st edition*, Geological Survey of New South Wales, Sydney) |
| Site Topography | Mid-slope of a west facing slope within moderately undulating land |
| Site Aspect | West |
| Site Elevation | Ranges between approximately 89 mAHD (west) and 102 mAHD (east) |
| Typical Slope | Approximately 15 – 20 % in the eastern half of the site, and 0 – 5 % in the western half of the site |
| Existing Vegetation | Predominantly grasses and introduced riparian vegetation. |
| Site Drainage | Via overland flow west towards an existing dam, which flows into an unnamed tributary of Ropes Creek 100 m north-west of the site's north-western boundary |

# 2 Flood Assessment

## 2.1 Proposed Earthworks

Presently, areas of the site intended to be used for school buildings are partially within the expected PMF flood inundation extents. To mitigate this site condition t is proposed that earthworks be completed to ensure that all school buildings are outside of the PMF flood extent and therefore outside any of the three flood risk precincts considered in the local controls.

Theproposed earthworks shall result in minor changes to the existing flood conditions at the site but are not expected to cause any impacts on neighbouring lots, as no flood storage is lost as a result of the earthworks. They also result in alterations to the 1 in 100 yr ARI and PMF flood extents for the site, changes which are discussed further below and are reflected in site flood extents mapping.

## 2.2 Existing Flood Conditions

### 2.2.1 Flood Inundation and Risk Precincts

BMT WBM (2013) *Rural Flood Study* documents a detailed flood study of the Ropes Creek catchment for Fairfield City Council. This study has been reviewed with respect to estimated flood peak heights and extents at the site for the 1 in 20 year ARI, 1 in 100 year ARI and Probable Maximum Flood (PMF) events and the Flood Risk Precincts adopted by Council.

Review of the flood maps for the site show that the site is impacted by the 1 in 20 year ARI, 1 in 100 year ARI and PMF events and has areas within the Low (i.e. between 1 in 100 yr and PMF extents), Medium and High Risk Flood Precincts, as shown on Council's Flood Risk Precinct map and flood certificate (Attachment B). The extent of High Risk Precinct is minimal limited to a very small section of watercourse channel on the western boundary.

The flood risk precinct mapping presented by BMT WBM must be reinterpreted to consider the proposed site regrading. All areas above the PMF flood level are outside of any of the three flood risk precincts. Therefore, with the proposed earthworks, the primary school buildings, site pedestrian and vehicle accessways and car park shall be outside of any mapped Flood Risk Precinct all being above the PMF level.

Some site areas mapped within the Low and Medium Risk Flood Precincts are proposed to be used as recreational areas. The very small area of High Risk Flood Precinct has no development proposed.

### 2.2.2 Council Flood Planning Certificates

A review of the available Flood Planning Certificates and model results provided by Council (Attachment B) for the site has been conducted. Table 2 summarises peak flood levels (mAHD) for the site and downstream lot.

**Table 2:** Summary of peak flood levels (mAHD) from Council Flood Planning Certificates and flood model results from Council.

| Flood Event | Planning certificate flood level (mAHD) | | Flood model peak flood level (mAHD) | |
|---|---|---|---|---|
| | Lot 2317 DP 1201268 (11 Kosovich Place) | Downstream Lot Lot 2314 DP 1133688 (32-40 Kosovich Place) | Southern Boundary Site | Boundary of site and Lot 2314 DP 1133688 |
| 1 in 20 year ARI | 88.5 – 92.1[1] | 85.1 – 89.3 | 92.1 | 89.3 |
| 1 in 100 year ARI | 88.5 – 93.0[1] | 85.4 – 90.1 | 93.0 | 90.1 |
| PMF | 89.2 – 100.6[1] | 88.1 – 90.9 | 93.6 | 90.9 |

Notes: [1]. Higher flood levels apply to land east of the current lot.

Approximate extents of the 1 in 100 year ARI and PMF events for both existing site conditions and for proposed conditions (i.e. after proposed earthworks) are shown on site plans in Attachment A. These flood extents are based on survey information and flood levels reported by Council.

Flood certificate levels provided by Council and summarised in Table 2 are for former Lot 2317 DP1201268, which was subdivided to form Lots 2316 – 2322 DP 1223137. The higher flood levels apply to the existing dam and surrounding areas on Lot 2316 DP 1223137, approximately 180 m east of the site boundary and do not apply to the western areas of the property.

## 2.3 Development Flood Impacts

### 2.3.1 Proposed Earthworks

Proposed minor site regrading works include 15 $m^3$ of fill and 17 $m^3$ of cut below the 1 in 100 yr ARI site flood level (see P1705798PS04-K100 in Attachment A) resulting in a very minor increase in flood storage volume. Therefore, we do not expect any adverse impact on flood conditions on adjacent sites. The extents of the 1 in 100 year ARI and PMF peak flood on the site will be slightly altered as shown by flood extent lines on site plan in Attachment A. Reference to 'proposed conditions' for flood lines reflect flood extents with changes caused by the proposed earthworks.

### 2.3.2 Fairfield City Council (2018) Development Control Plan 2013 Amendment 16

A review of the flood planning controls in Fairfield DCP (2018) has been completed with respect to the development. Schedule 2 of Chapter 11 of the DCP summarises land use categories. The proposed development is best described as an 'educational establishment' under 'Sensitive Uses and Facilities'. The development is located outside of the Georges River and Cabramatta Creek floodplains and therefore the flood planning controls in Schedule 6 of Chapter 11 of the DCP apply.

As school buildings, car park and access are located in areas above the PMF level and therefore outside all mapped flood risk precincts, they are not subject to flood planning controls. Nonetheless, Table 3 provides the controls for a school development within a Low Flood Risk Precinct – while strictly these controls do not apply they should be considered for development planning purposes.

Controls for site recreation areas located in 'Low Flood Risk' and 'Medium Flood Risk' precincts have been reviewed with respect to the proposed recreational areas (Table 3 and Table 4).

**Table 3:** Summary of flood control and planning requirements of Fairfield City Council DCP 2013 for Low Flood Risk Precinct.

| Planning Consideration | Controls |
|---|---|
| 1 – Floor Level | 3. Habitable floor levels to be no lower than the PMF level. Non-habitable floor levels to be no lower than the PMF level unless justified by a site specific assessment. |
| 2 – Building components | 2. All structures to have flood compatible building components below the PMF level. |
| 3 – Structural soundness | 3. Applicant to demonstrate that any structure can withstand the forces of floodwater, debris, and buoyancy up to and including a PMF. An engineer's report may be required. |
| 4 – Flood effects | 2. The flood impact of the development to be considered to ensure that the development will not increase flood effects elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels and velocities caused by alterations to the flood conveyance; and, (iii) the cumulative impact of multiple potential developments in the floodplain. An engineer's report may be required. |
| 5 – Car parking and driveway access[1] | 1. The minimum surface level of open car parking spaces or car ports shall be as high as practical.<br>7. Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during the 1 in 100 year ARI flood. |
| 6 – Evacuation | 3. The development is to be consistent with any relevant flood evacuation strategy or similar plan.<br>4. The evacuation requirements of the development are to be considered. An engineer's report will be required if circumstances are possible where the evacuation of persons might not be achieved within the effective warning time. |
| 7 – Management and design | 5. No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood. |
| 8 – General notes and requirements | 1. Freeboard equals an additional height of 0.5 m.<br>3. Filing of the site, where acceptable to Council, may change the Flood Risk Precinct considered to determine the controls applied in the circumstances of individual applications. |

Note: [1.] Conditions 3 and 6 relate specifically to enclosed car parking and garages. The development does not include any garages or enclosed car parking.

**Table 4:** Summary of flood control and planning requirements of Fairfield City Council DCP 2013.

| Planning Consideration | Low and Medium Flood Risk Controls[1] |
|---|---|
| 1 – Floor Level | 1. All floor levels to be no lower than the 1 in 20 year flood level unless justified by site specific assessment.<br>6. Non-habitable floor levels to be equal to or greater than the 1 in 100 year flood level plus freeboard where possible, or otherwise no lower than the 20 year flood level unless justified by a site specific assessment. |
| 2 – Building components | 1. All structures to have flood compatible building components below the 1 in 100 year level plus freeboard. |
| 3 – Structural soundness | 2. Applicant to demonstrate that the structure can withstand the forces of floodwater, debris, and buoyancy up to and including a 1 in 100 year flood plus freeboard, or a PMF is required to satisfy evacuation criteria. An engineer's report may be required. |
| 4 – Flood effects | 2. The flood impact of the development to be considered to ensure that the development will not increase flood effects elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels and velocities caused by alterations to the flood conveyance; and, (iii) the cumulative impact of multiple potential developments in the floodplain. An engineer's report may be required. |
| 5 – Car parking and driveway access[2] | 2. The minimum surface level of open car parking spaces, carports or garages shall be as high as practical.<br>3. Garages capable of accommodating more than 3 motor vehicles on land zoned for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year flood.<br>4. The driveway providing access between the road and parking space shall be as high as practical and generally rising in the egress direction.<br>6. Enclosed car parking and car parking areas accommodating more than 3 vehicles (other than on Rural zoned land), with a floor level below the 20 year flood level or more than 0.8 m below the 100 year flood level, shall have adequate warning systems, signage and exits.<br>7. Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during the 1 in 100 year ARI flood. |
| 6 – Evacuation | 3. The development is to be consistent with any relevant flood evacuation strategy or similar plan.<br>4. The evacuation requirements of the development are to be considered. An engineer's report will be required if circumstances are possible where the evacuation of persons might not be achieved within the effective warning time. |
| 7 – Management and design | 2. Site Emergency Response Flood Plan required where floor levels are below the design floor level (except for single dwelling house)<br>3. Applicant to demonstrate that area is available to store goods above the 100 year flood level plus freeboard.<br>5. No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood. |
| 8 – General notes and requirements | 1. Freeboard equals an additional height of 0.5 m.<br>2. The relevant environmental planning instruments (generally the Local Environment Plan) identify development permissible with consent in various zones in the LGA. Notwithstanding, constraints specific to individual sites may preclude Council granting consent for certain forms of development on all or part of a site. This matrix identifies where flood risks are likely to determine where certain development types will be considered "unsuitable" due to flood related risks.<br>3. Filing of the site, where acceptable to Council, may change the Flood Risk Precinct considered to determine the controls applied in the circumstances of individual applications. |

Note: [1.] Low and Medium Flood Risk Precinct Controls are the same for proposed recreation areas. [2.] Conditions not considered relevant as proposed recreational areas not include any car parking or access to car parking, garages or enclosed car parking.

Compliance of the proposed recreation areas of the development with the controls in Table 4 is summarised in Table 5.

**Table 5:** Summary of development compliance with Council flood controls and planning requirements.

| Planning Consideration | Compliance | Development complies (Y/N) |
|---|---|---|
| 1 – Floor Level | Proposed recreational structures within the Low and Medium Risk Precincts are not habitable and do not include 'floor' levels. Structures consist of a basketball court; football field and associated fixed goal posts and minor spectator shelter which will not include walls. | Y |
| 2 – Building components | All building components shall be flood compatible below the 100 year level plus 0.5 m freeboard. | Y |
| 3 – Structural soundness | All structures below the 1 in 100 year ARI level plus 0.5 m freeboard are to be designed by a structural engineer to withstand the forces of floodwater, debris, and buoyancy up to and including the 1 in 100 year ARI plus 0.5 m freeboard. | Y |
| 4 – Flood effects | No habitable buildings are proposed within the extents of the Low and Medium Flood Risk Precincts. Proposed earthworks and alterations to flood extents are expected to be localised to within the subject site. | Y |
| 5 – Car parking and driveway access | No car parking areas are proposed in Low and Medium Flood Risk Precincts. | Y |
| 6 – Evacuation | Site areas within Low and Medium Flood Risk Precincts are proposed to be used for recreational purposes. Site management shall be strictly implemented such that no students or staff are permitted to be in these areas during prolonged or intense rainfall.<br><br>Evacuation from site recreational areas shall be achieved on foot along site paths or other open spaces. Distances to flood free site areas are not more than 250 m from furthest area proposed to be used for recreational purposes. Adequate warning time is expected to be available to evacuate Low and Medium Risk Precinct areas on site with evacuation initiated by the onset of rain (at which stage normal school process would be for students to move indoors – given all buildings are above the PMF this would achieve the safe evacuation of potentially flood effected lands long before any inundation). | Y |
| 7 – Management and design | Site use in Low and Medium Flood Risk Precincts intended to be recreational in character. No hazardous or potentially polluting goods or materials would be stored in these areas of the site. | Y |
| 8 – General notes and requirements | Areas of the site within Low and Medium Risk Flood Precinct shall be used for recreational purposes only. All floor levels of the school, car parking areas and site accesses to Kosovich Place are higher than the PMF level. | Y |

## 2.4 Riparian Zone Management

Reference to be made to the Riparian Zone Management Assessment by Martens (reference P1705798JR03V02, July 2018) for requirements for riparian zone management.

## 2.5 Additional Works at Detailed Design

Further flood assessment works may be required, including a detailed flood emergency and evacuation plan for the school.

All flood mitigation measures, including finished floor levels of habitable buildings, will need to be integrated with the final stormwater management design for the school, as well as any riparian management and rehabilitation works that may be included in development consent conditions.

# 3 References

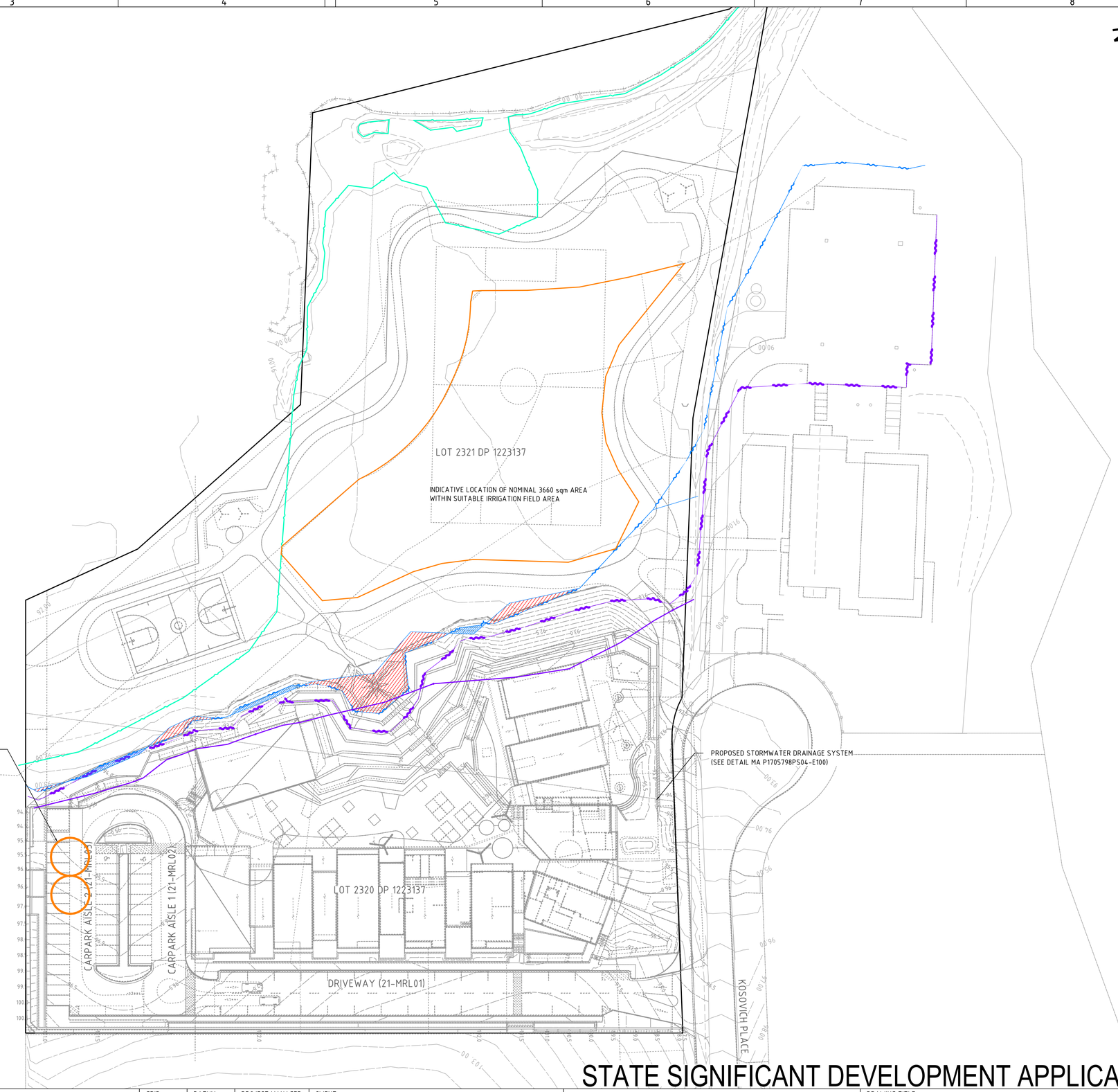
BMT WBM (November 2013) *Rural Area Flood Study: Ropes, Reedy & Eastern Creeks Final Report*

Fairfield City Council (September 2018) *Development Control Plan 2013: Amendment 16.*

Fairfield City Council (February 2017) *Planning Certificate: 11 Kosovich Place, Cecil Park, NSW.*

Fairfield City Council (February 2017) *Planning Certificate: 32 – 40 Kosovich Place, Cecil Park, NSW.*

# 4 Attachment A – Site Plans




NOTE:
1. APPROXIMATE EXTENTS OF EXISTING 1 IN 100 YEAR ARI & PMF INTERPOLATED FROM FAIRFIELD CITY COUNCIL (FEBRUARY 2017) FLOOD CERTIFICATE. REFER TO ATTACHMENT B OF FLOOD ASSESSMENT REPORT MA REFERENCE: P1705798JR04V04 (SEPTEMBER 2018).
2. APPROXIMATE EXTENTS OF PROPOSED 1 IN 100 YEAR ARI & PMF BASED ON PROPOSED SITE EARTHWORKS.

KEY

- APPROXIMATE EXTENTS OF 1 IN 20 YEAR ARI FLOOD
- APPROXIMATE PROPOSED EXTENTS OF 1 IN 100 YEAR ARI FLOOD
- APPROXIMATE EXISTING EXTENTS OF 1 IN 100 YEAR ARI FLOOD
- APPROXIMATE PROPOSED EXTENTS OF PMF
- APPROXIMATE EXISTING EXTENTS OF PMF
- CHANGED EXTENTS OF 1 IN 100 YEAR FLOOD (REDUCED FLOOD STORAGE VOLUME - 15 M3)
- CHANGED EXTENTS OF 1 IN 100 YEAR FLOOD (INCREASED FLOOD STORAGE VOLUME - 17 M3)

# STATE SIGNIFICANT DEVELOPMENT APPLICATION

| REV | DESCRIPTION | DATE | DRAWN | DESIGNED | CHECKED | APPRVD |
|---|---|---|---|---|---|---|
| B | MINOR AMENDMENT | 14/09/2018 | GM | MD | MD | TH |
| A | MINOR AMENDMENT | 11/09/2018 | GM | MD | DG | TH |

SCALE: A1 (A3) 1:500 (1:1,000) — 0 5 10 15 20 25 30 35 40 45 50 METRES

GRID | DATUM | PROJECT MANAGER: TH

CLIENT: ASSYRIAN SCHOOLS LTD

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PROJECT NAME/PLANSET TITLE
ST PETER & PAUL ASSYRIAN PRI. SCHOOL
CIVIL WORKS MASTER PLAN
17 & 19 KOSOVICH PLACE, CECIL PARK, NSW
LOTS 2320 & 2321, DP 1223167

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DRAWING TITLE
SITE PLAN - 1 IN 20 YEAR ARI, 1 IN 100 YEAR ARI AND PMF FLOOD EXTENTS

| PROJECT NO. | PLANSET NO. | RELEASE NO. | DRAWING NO. | REVISION |
|---|---|---|---|---|
| P1705798 | PS03 | R06 | PS03-K100 | B |

# 5 Attachment B – Planning Certificate Extract: Flood Information Sheet and Flood Contours from Council

Fairfield City
Celebrating diversity
Fairfield City Council

# Flood Information Sheet

Fairfield City Council
Administration Centre
86 Avoca Road
WAKELEY NSW 2176
PO Box 21
FAIRFIELD NSW 1860
Telephone: (02) 9725 0222
Facsimile: (02) 9609 3257

## Applicant's Details:

| | |
|---|---|
| Applicant's Name | **Martens & Associates Pty Ltd** |
| Postal Address | **Suite 201, 20 George Street HORNSBY NSW 2077** |
| Phone | |
| Fax | |

## Property Particulars:

| | |
|---|---|
| House No. | **11** |
| Street & Suburb | **Kosovich Place CECIL PARK** |
| Lot Description | **Lot 2317 DP 1201268** |

*Council has adopted a policy on flooding which may restrict the development of land. The Fairfield City-Wide Development Control Plan 2013 (which includes provisions for flood management) applies to all of the Fairfield Local Government area.*

*Part or all of this land may be affected by mainstream flooding.*

## MAINSTREAM FLOODING

### Description

This parcel is identified as being partly within a **High** Flood Risk Precinct, partly within a **Medium** Flood Risk Precinct, partly within a **Low** Flood Risk Precinct as a result of mainstream flooding and partly **not affected** by mainstream flooding.

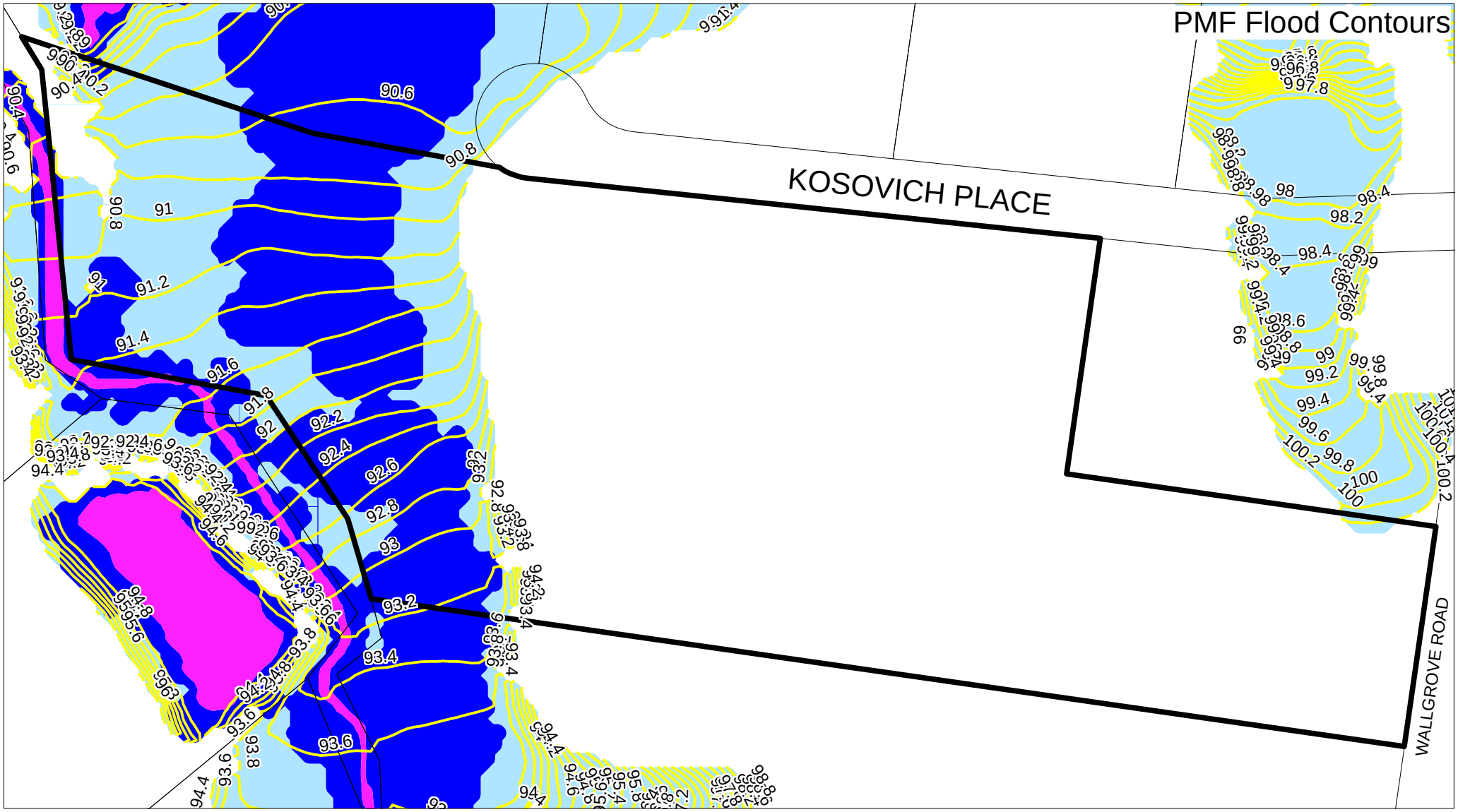
### Mainstream Flood Details

| Size of Flood | Flood Level (m AHD) |
|---|---|
| Probable Maximum Flood (PMF) | 89.2 – 100.6 |
| 100 Year ARI | 88.5 – 93.0 |
| 50 Year ARI | 88.5 – 93.0 |
| 20 Year ARI | 88.5 – 92.1 |

Flood levels in the vicinity of the above property have been extracted from the BMT WBM (2013) *Rural Area Flood Study.*

23 February 2017

Glossary over page




High Flood Risk Precinct

Medium Flood Risk Precinct

Low Flood Risk Precinct

# Lot 2317 Kosovich Place, Cecil Park

Taken from the BMT-WBM (2013) Rural Area Flood Study.

1 March 2017

FairfieldCity
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# Part of Lot 2317 Kosovich Place, Cecil Park

Taken from the BMT-WBM (2013) Rural Area Flood Study.

16 March 2017

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