

School Infrastructure NSW

Flood Assessment:
New Education Campus at Jindabyne,
207 Barry Way, Jindabyne, NSW



ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



P2108169JR01V04
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All enquiries regarding this project are to be directed to the Project Manager.

Executive Summary

Martens & Associates Pty Ltd (MA) have prepared this flood assessment to support a State Significant Development application (SSD No 15788005) for the proposed new education campus at 207 Barry Way, Jindabyne, NSW (the site). This report documents the procedures and findings of hydrologic and hydraulic modelling of the site in existing conditions.

Assessment concluded that:

1. Proposed flood characteristics are expected to be consistent with existing conditions, and no differences are expected due to the proposed development.
2. The proposed development area of the site is flood free in the 1% AEP flood (with and without climate change) and PMF events.
3. The proposed high school development would have acceptable offsite flood impacts.
4. Flood risks to life on site are low, and both evacuation and shelter-in-place emergency response strategies are available to further mitigate flood risks.
5. All building finished floor levels are above the FPL and PMF levels.
6. The compliance assessment demonstrates the site can be developed in accordance with Council flood planning requirements.

Whilst the proposed development is not affected by flood hazards during all floods up to and including the PMF event, we recommend that school management subscribes to the relevant flood warning systems and maintain communication with SES and local police at all times with respect to flood emergency response.

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1 Introduction

1.1 Overview

This flood assessment accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD No 15788005). The SSDA is for a new education campus at Jindabyne, comprising of a new primary and high school, located at the Jindabyne Sport and Recreation Centre (JSRC).

This report addresses the Secretary's Environmental Assessment Requirements (SEARs), notably:

16. Flooding

- *Identify any flood risk on-site in consultation with Council and having regard to the most recent flood studies for the development area and the potential effects of climate change, sea level rise and an increase in rainfall intensity.*
- *Assess the impacts of the development, including any changes to flood risk on- site or off-site, and detail design solutions to mitigate flood risk where required.*

Relevant Policies and Guidelines:

- *NSW Floodplain Development Manual (DIPNR, 2005).*

Refer to Attachment A for site survey and Attachment B for proposed site layout.

1.2 Project Scope and Objectives

Project scope and objectives are:

1. Prepare a hydrologic model (RAFTS) for the site to determine the peak flow of the 1% annual exceedance probability (AEP) flood with and without climate change and probable maximum flood (PMF) events.
2. Prepare a hydraulic model (TUFLOW) for the site under existing conditions.
3. Prepare relevant flood maps including flood extents, depths, levels, velocities and hazards.

4. Comment on flood characteristics and model outcomes in existing and proposed conditions.
5. Prepare preliminary flood emergency response plan (FERP) comments.
6. Prepare a compliance assessment in accordance with Snowy Monaro Regional Council (SMRC) floodplain development controls.

1.3 Summary of Agency Comments

This assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for the project dated 7 April 2021. Table 1 below provides a summary of the relevant SEARs regarding flooding.

Table 1: Flooding related SEARs for the proposed development.

SEARs Requirement	MA Response	Section of Report
Identify any flood risk on-site in consultation with Council and having regard to the most recent flood studies for the development area and the potential effects of climate change, sea level rise and an increase in rainfall intensity.	MA have consulted SMRC regarding the available flood information at the site, who confirmed there is no available flood study covering the site, and the site is not mapped as flood prone.	Section 2.4
	Potential increase in rainfall intensity as a result of climate change has been included in the flood assessment. Potential sea level rise is not relevant at the site.	Section 3.2, Section 4.6 and Attachment C
Assess the impacts of the development, including any changes to flood risk onsite or off-site, and detail design solutions to mitigate flood risk where required.	Impacts of the development have been assessed and presented in the report.	Section 4.6.3
Relevant Policies and Guidelines: NSW Floodplain Development Manual (DIPNR, 2005).	This flood assessment has been prepared in accordance with NSW Floodplain Development Manual.	

1.4 Relevant Guidelines

This report has been prepared in accordance with the following guidelines and policies:

1. Commonwealth of Australia (Geoscience Australia) (2019), *Australian Rainfall and Runoff – A Guide to Flood Estimation*.
2. NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*.

3. Snowy Monaro Regional Council (2013a), *Snowy River Local Environmental Plan (LEP)*.
4. Snowy Monaro Regional Council (2013b), *Snowy River Development Control Plan (DCP)*.

1.5 Definitions

AEP	Annual exceedance probability: the probability of a flood event occurring within a year. A 1% AEP flood has a 1% chance of occurring in any given year.
ARI	Average recurrence interval: the average time between flood events occurring. A 100 year ARI flood occurs on average once every 100 years.
ARR	Australian Rainfall & Runoff
BOM	Bureau of Meteorology
Council	Snowy Monaro Regional Council (SMRC)
FERP	Flood emergency response plan
FFL	Finished floor level
IFD	Intensity frequency duration – design rainfall data for frequent and infrequent storm events.
MA	Martens & Associates Pty Ltd
PMF	Probable maximum flood – the most extreme flood event possible for a certain location, with an approximate ARI of 100,000 to 10,000,000 years.
PMP	Probable maximum precipitation – design rainfall data for extreme storm events.

2 Site Description and Background Data

2.1 Location and Site Description

The site of the proposed new education campus at Jindabyne is located within the western extent of the existing JSRC at 207 Barry Way (101 DP1019527). The site is located within the Snowy Monaro Regional Council local government area and is approximately 2.2km south of the Jindabyne town Centre. A site aerial is provided in Figure 2.

The site is approximately 9ha in size, containing a former golf course and three existing workers cottages which were occupied during the construction of the Snowy Hydro Scheme. The majority of the site is undeveloped and contains maintained grasslands and scattered trees. Much of the surrounding land comprises remnant grassland, woodland and agricultural land.

As identified above, the site is within the existing JSRC which is a high performance and community sport centre located directly east of the site. The JSRC has a range of sporting facilities including a synthetic running track, cycling track, netball and tennis courts, fitness and indoor sports centres, and sporting ovals, as well as other services and accommodation facilities. The newly constructed BMX track is located directly east of the site with the new ski jump currently under construction to the northeast.

TAFE NSW have recently lodged a development application for a Connected Learning Centre (CLC) and Mobile Training Unit (MTU) which is proposed to the south of the site. The CLC and MTU will utilise interactive, digitally enabled, flexible, and multipurposed learning environments to provide high-quality training and learning experiences accommodating a maximum of 20-25 students and 3 teachers.

The surrounding locality is generally rural in character with other land uses also including the Jindabyne Aero Club located to the west of the site on Tinworth Drive, an industrial area to the southwest and the Jindabyne Community recycling centre is located east of the JSRC.

We note this flood model covers the majority of Lot 101 DP1019527, but the flood assessment commentary is focussed on the 9.5 ha proposed development area shown in Figure 1.



Figure 1: Site aerial – new education campus within the Jindabyne Sport and Recreation Centre.
 Source: DJRD

Existing site description summary is provided in Table 2.

Table 2: Existing site description summary.

Address	207 Barry Way, Jindabyne, NSW
Lot / DP	Lot 101 DP 1019527
Proposed Development Area	Approximately 9 ha
Local Government Area (LGA)	Snowy Monaro Regional Council (SMRC)
Current Land Use	The proposed development area of the site is predominantly vacant land, with scattered trees and several buildings and associated driveways.
Current Zoning	RU1 – primary production
Site Description	The site is primarily grassed at higher elevations and low density bushland at lower elevations. The site contains a former golf course and several structures including buildings

Surrounding Land Uses	and associated driveways. Grassland, woodland and agricultural land to north and south, Barry Way to west and Jindabyne Sport and Recreation Centre (JSRC) to east.
Site Elevation	Approximately 985 mAHD at northern and eastern site boundaries rising to approximately 1001 mAHD at western site boundary.
Site Grading & Aspect	Approximately 5 – 10%, NNE aspect
Site Drainage	Lees Creek is located to the east of the site, running from south to north. There are several minor pipelines on Barry Road and the internal road along the site boundary to the south.

2.2

2.2 Catchment Description

We note the following regarding the catchment upstream of the site:

- The site is located within the Lees Creek catchment which flows to Lake Jindabyne.
- Upstream catchment is primarily bushland and agricultural areas, and includes the Leesville industrial estate of Jindabyne.
- There is an unnamed drainage line southwest of the site flowing to Lees Creek.
- The total catchment area is approximately 377 ha and is shown in Attachment C Map FL01.

2.3 Site Flood and Overland Flow Mechanisms

The site is likely affected by the following flood mechanisms:

- Overland flows from the site itself and the local upstream catchment (refer Section 2.2).
- Flood overbank flows from Lees Creek.

2.4 Previous Flood Studies

A review of previous flood investigations was undertaken to assess likely local flood behaviour and characteristics for the site and the Lees Creek catchment. This review did not identify any flood studies adopted by SMRC which would be relevant to this assessment. Consultation with SMRC confirmed that there is no available flood study covering the site, and the site is not mapped as flood prone.

2.5 Proposed Development

The proposed development is for the construction of the Jindabyne Education Campus comprising a new primary school and a new high school at Jindabyne (the proposal). The proposal is located within the JSRC located at 207 Barry Way (the site) and will accommodate approximately 925 students with the capacity for expansion in the future.

The new primary school will be located generally in the northern portion of the site whilst the new high school will be to the south of the site. While the schools are inherently separate identities, with separate student entries, opportunities for integration are provided in a central shared plaza with co-located school administration facilities, as identified in Figure 2 below. This outdoor learning space is activated by the school canteen (shared) and separate core facilities including the primary school hall and library, and the high school gym and library, and provides opportunities for shared community use.

The new primary school will provide for a Core 21 school. This will comprise of 20 home base units and 2 support learning units, administration and staff facilities, covered outdoor learning area (COLA), hall, staff and student amenities, out of school care facilities, library and special programs. Landscaped areas include active and passive open space play areas, and a games court.

The new high school will provide for a stream 2 high school. This is to comprise of 20 general/specialised learning spaces and support learning units, administration and staff facilities, covered outdoor learning area (COLA), hall, staff and student amenities, library, an agricultural learning unit. Landscaped areas include active and passive open space play areas, a sports field and multipurpose games courts.

A new access driveway is proposed off Barry way Road along the western boundary of the site and includes car parking, bus and private vehicle drop-off zones, and delivery zones.

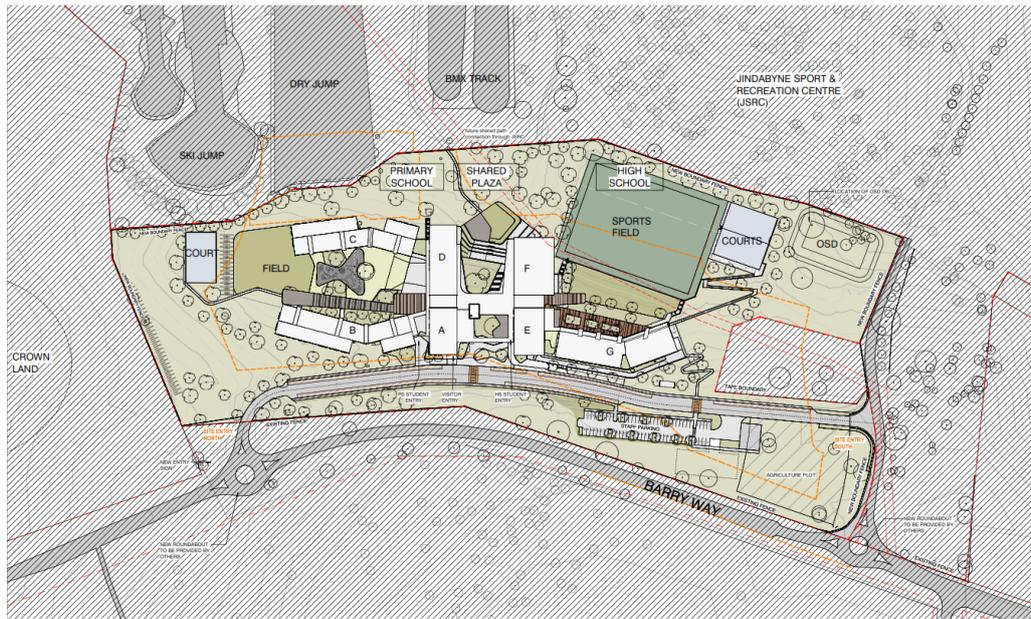


Figure 2: Proposed site plan. Source: DJRD

3

3 Hydrology Modelling

3.1 Overview

The DRAINS software package (version 2020.061 – 22 Dec, 2020) was used with the RAFTS hydrological engine to assess the 1% AEP flood (with and without climate change) and PMF peak flow rates for a range of storm durations between 5 minutes and 168 hours.

3.2 Model Setup

Parameters used in the model are provided in Table 3. Model inputs are as follows:

1. Sub-catchment delineation, flow paths and slopes were developed using LIDAR data provided by Land and Property Information NSW (LPI 2018) and site survey (Attachment A) provided by CMS Surveyors Pty Ltd (May 2021). Refer to Attachment C Map FL01 for site catchment plan.
2. Sub-catchment impervious areas were adopted based on recent catchment aerials obtained from Nearmaps (2017) and Google Satellite (2021).
3. Roughness coefficients were determined using a weighted average based on the XP-RAFTS (1996) *User's Manual* and each sub-catchment's land use as per recent site aerials obtained from Nearmaps (2017) and Google Satellite (2021).
4. Intensity Frequency Duration (IFD) data and rainfall temporal patterns were based on the Bureau of Meteorology (BOM 2021) *Rainfall IFD Data System* and the Australian Rainfall & Runoff (ARR 2019) *Data Hub*.
5. 1% AEP rainfall intensities were increased by 16.3% for the worst-case climate change scenario in accordance with the Australian Rainfall & Runoff (ARR 2019) *Data Hub* RCP 8.5 value for 2090.
6. Probable Maximum Precipitation (PMP) intensities and temporal distributions were determined using the BOM (2003) *Generalised Short-Duration Method*.
7. RAFTS parameters have been derived from the suggested values in the XP-RAFTS (1996) *User Manual*. Sub-catchment surface soils are assumed to be loam, based on the NSW Government Environment & Heritage (2021) *eSPADE – NSW Soil and Land Information* website.

Table 3: Details of sub-catchments used in RAFTS modelling.

Sub-catchment ¹	Area (ha) ¹	Catchment Slope (%) ¹	Impervious (%) ²	PERN Roughness Coefficient ³
South	277.4	10.7	6.5	0.061
West	51.0	8.8	4.5	0.060
East	37.6	6.3	8.2	0.056
North	11.2	7.7	3.6	0.058
Total	377.2			

Notes

1. Obtained based on survey data provided by CMS Surveyors Pty Ltd (May 2021, Attachment A) and LIDAR data provided by LPI (2018). Refer to Attachment C Map FL01 for site catchment plan.
2. Adopted based on recent catchment aerials obtained from Nearmaps (2017) and Google Satellite (2021).
3. Obtained from the weighted average land use based on recent catchment aerial photographs obtained from Nearmaps (2017) & Google Satellite (2021), and the XP-RAFTS User Manual (1996).

3.3 Results

Table 4: Peak 1% AEP with and without climate change and PMF flow rates for critical duration storms estimated by DRAINS modelling for sub-catchments arriving at the site.

Flood Event	Critical Storm Duration (mins)	Peak Catchment Flow Rates (m ³ /s)				Total ¹
		South	West	East	North	
1% AEP	45	26.9	6.2	5.2	1.8	40.1
1% AEP climate change ²	45	34.9	8.0	6.5	2.1	51.5
PMF	45	266.	53.0	40.6	12.7	372.3

Notes

1. The offset of the timing of each catchment's hydrograph means the total flow rate is not always equal to the sum of all catchment peak flow rates.
2. Based on 16.3% increased rainfall intensity in accordance with the ARR (2019) *Data Hub* RCP 8.5 value for 2090.

4 Hydraulic Modelling

4.1 Overview

The TUFLOW hydraulic model was used to determine flood characteristics including flood extents, levels, depths, velocities and hydraulic hazard for the critical 1% AEP flood with and without climate change and probable maximum flood (PMF) events for existing conditions.

The existing conditions flood results indicated that the proposed development area of the site is flood free in all events up to and including the PMF. Based on the finished floor levels (FFLs) provided by DJRD Architects (Attachment B), the proposed development is located well above the flood planning level (FPL), hence the proposed development will not be subjected to flood affectation. Therefore, no proposed conditions model has been conducted as part of this assessment.

4.2 Scenarios

The hydraulic model was setup to represent the existing condition, being the catchment and site in their current state as described in Sections 2.1, 2.2 and 2.3.

The hydraulic model was used to assess flooding for the following events:

1. 1% AEP 45 minute (critical duration) event.
2. 1% AEP with climate change (16.3% increased rainfall intensity) 45 minute (critical duration) event.
3. PMF 45 minute (critical duration) event.

In summary, a total of 3 scenarios were modelled as part of this assessment.

4.3 Terrain Data

Catchment LIDAR data provided by LPI (2018) was merged with site survey data (Attachment A) provided by CMS Surveyors Pty Ltd (May 2021) to create a 3D surface for the existing conditions site and the local floodplain environment used in the TUFLOW model.

4.4 Model Setup

TUFLOW model construction for existing conditions consisted of:

1. A 2.0 m topographic grid based on the available survey and LIDAR data.
2. The model domain was defined from a point 200 m upstream of the proposed development area to a point 100 m downstream of the site, and included the areas of the West, East and North catchments (refer to Attachment C Map FL01). Model boundary extents were generally placed along catchment ridgelines and connecting catchment high points surrounding the study area
3. A direct rainfall boundary condition based on the critical duration 1% AEP (with and without climate change) and PMF hyetographs from DRAINS. The boundary condition comprised the local site catchments (the West, East and North catchments, refer to Attachment C Map FL01) and enabled automatic flood water routing.
4. Inflow boundary condition based on the critical duration 1% AEP (with and without climate change) and PMF hydrographs from DRAINS for each of the South catchment refer to Attachment C Map FL01).
5. Computed water slopes for downstream model extent boundary conditions based on the slopes from available LIDAR data.
6. Manning's zones based on Nearmaps (2017) aerial photography of the study area with roughness coefficients adopted as per Table 5.
7. Hydrologic loss coefficients for pervious and impervious catchment materials were consistent with hydrologic modelling (refer Section 3.2) and were adopted as per Table 5.
8. The invert of Lees Creek was modelled as a z-line modifications to ensure inclusion in the existing model surface.
9. A 1D network to model the relevant pit and pipe network:
 - a. All pits and pipes surveyed by CMS Surveyors have been modelled.
 - b. 1D network pipe sizes, invert levels and locations are based on CMS Surveyors (2021) survey data (Attachment A) and LIDAR data.

- c. Pipe roughness coefficient of 0.013 (concrete) was adopted.
- d. Pipe blockages of 20% and 50% have been adopted based on the assessment procedure in Australian Rainfall and Runoff (Weeks & Rigby, 2016).

10. Existing dams are conservatively assumed to be full.

Table 5: Manning's roughness and hydrologic loss values for TUFLOW modelling.

Catchment Material Type	Manning's Roughness Coefficient ¹	Initial Loss (mm) ²	Continuing Loss (mm/hr) ²
Roof	0.015 when depth ≤ 0.05 m	1.5	0.0
	0.300 when depth > 0.10 m		
	0.015-0.300 when depth 0.05-0.10 m		
Smooth Bare Earth	0.025	10.0	1.0
Cultivated Areas / Short Grass	0.035	10.0	1.0
Intermediate Length Grass	0.045	10.0	1.0
Intermediate Length Grass with Shrubs and Trees	0.055	10.0	1.0
Open Channel	0.065	10.0	1.0
Industrial / Commercial Areas ³	0.250	2.35	0.1
Roads / Concrete	0.020	1.5	0.0
Water Body	0.030	1.5	0.0

Notes

1. Based on typical values from similar catchments.
2. Hydrologic losses were consistent with RAFTS modelling as detailed at Section 3.2.
3. Based on the weighted average land use of a representative urban area and the adopted roughness coefficients and losses for pervious / impervious areas.

4.5 Results

Flood mapping results (flood levels, depths, velocities and hazard categories) for the critical duration 1% AEP flood event with and without climate change and PMF events in existing conditions are provided in Attachment C, with drawing references summarised in Table 6.

Table 6: Flood map drawing references in Attachment C (MA mapset P1208169MS01). ¹

Flood Condition Scenario	Critical Duration Flood Event	Water Level & Depth	Water Velocity	ARR Flood Hazard Categories ²
Existing Conditions	1% AEP	FL02	FL03	FL04
	1% AEP (CC ³)	FL05	FL06	FL07
	PMF	FL08	FL09	FL10

Notes

1. Flood results have been filtered to show areas of greater than 100 mm depth.
2. ARR flood hazard categories are based on ARR flood hazard curve (2019) definitions and are shown in Figure 3.
3. Climate change scenario based on 16.3% increased rainfall intensity in accordance with ARR Data Hub.

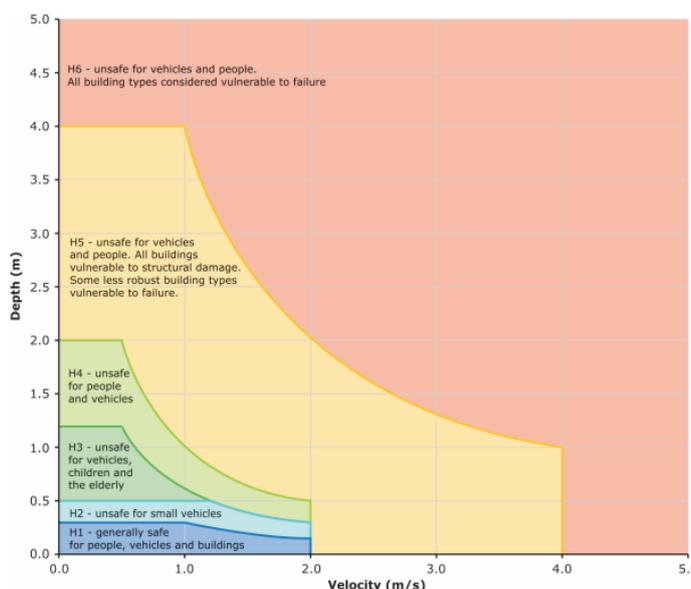


Figure 3: Flood Hazard Curves (Geoscience Australia, 2019).

4.6 Discussion

We note the following regarding modelled flood behaviour:

4.6.1 Existing Conditions

1. The primary source of site flooding is overbank flows from Lees Creek and shallow overland flow in local drainage depressions.
2. In the PMF event, flood waters break the banks of Lees Creek and flow from northeast to southwest through the centre of the site.
3. The proposed development area of the site is primarily unaffected by flooding in all events up to and including the PMF.
4. The peak 1% AEP flood and PMF levels in Lees Creek adjacent to the proposed development area are approximately 969.6 mAHD

and 970.0 mAHD respectively. Proposed building ground FFLs range between 994.5-996.2 mAHD, hence Lees Creek flood waters do not affect the proposed development.

5. The only proposed building affected by the PMF is PS.B. At this location there is a small area of shallow overland flow, which is less than 0.15 m deep and ARR hazard category H1 in the PMF event. This is considered to be stormwater ponding rather than floodwater and represents an immaterial risk to people and property.
6. Other areas of the proposed development, including the sports field south east of the development and the winding footpath north west of the development, are also affected by shallow overland flows. PMF characteristics in these areas are mostly less than 0.3 m deep and ARR hazard category H1-H2, which also represents immaterial risks to people and property.
7. There are other small areas of shallow water in all modelled events. This is not considered to be flood water but rather shallow stormwater ponding, which is a consequence of the direct rainfall modelling approach and the presence of trapped low points.
8. The 1% AEP climate change levels, depths and hazards are slightly elevated above the 1% AEP flood characteristics, however are below / lower than the PMF characteristics.

4.6.2 Proposed Conditions

Proposed flooding conditions are expected to be unchanged from existing conditions because:

1. The proposed development area is predominantly flood free in the 1% AEP flood (with and without climate change) and PMF events.
2. The proposed development is located well above the mainstream flooding levels in Lees Creek.

4.6.3 Offsite Flood Impacts

As the proposed development area is flood free in all events up to and including the PMF, there will be no offsite impacts to the floodplain environment as a result of the proposed development.

5 Preliminary Flood Emergency Response Plan Comments

Whilst all the proposed development elements are not affected by flood events up to and including the PMF, the following preliminary comments are provided to mitigate risks associated with flooding:

1. Access to flood free land is available for all site occupants on the ground floor and on all upper floor levels.
2. The proposed site access roundabouts are affected by H1 flood hazards in the 1% AEP event (with and without climate change) and up to H5 flood hazards in the PMF. Whilst safe evacuation is possible during the peak of the 1% AEP event, evacuation will not be possible at the peak of the PMF.
3. Both evacuation and shelter-in-place are recommended as emergency response strategies for site occupants. However, during any site evacuation flood waters are not to be entered by vehicles or people to avoid high flood hazards in events larger than the 1% AEP flood.
4. The primary flood emergency response is to evacuate the site prior to the onset of heavy rainfall. However, if heavy rainfall commences or flood waters cover the site access roads, site occupants are to shelter-in-place in site buildings above the PMF level until roads are clear of floodwater.
5. The proposed development will only be affected by flooding caused by large-scale storm events. Such large-scale flood events will be widely anticipated several days in advance.
6. Site management will be subscribed to the following systems and may be alerted to flood warnings via the following mechanisms:
 - a. SES emergency alert telephone warning system.
 - b. BOM alerts and press releases.
 - c. Weather apps (e.g. 'Early Warning Network').
 - d. Media warnings (TV, radio, internet etc.).
 - e. Police and / or SES door knocking.

6 Flooding Compliance Assessment

Flood specific controls are provided in the Snowy River DCP (2013b) at Chapter C7.2 'Flood Prone Land'. A compliance assessment for the proposed development based on Chapter C7.2.3 and C7.2.4 is summarised in Table 7, and considers the controls for new residential development, as the DCP does not include specific land use requirements for schools.

Table 7 demonstrates that all the applicable flood planning requirements for the proposed development site are effectively addressed, and compliance with the Snowy Monaro Regional Council DCP is achieved.

Table 7: Compliance with Snowy River DCP (2013b) flood controls.

Snowy River DCP Requirement	Compliance Assessment
2.3 FLOOD PLANNING LEVEL	
The flood planning level is the level of the 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard (refer Snowy River LEP 2013 – clause 7.5 Flood planning).	
2.4 CONTROLS	
(a) All development should be located above the flood planning level.	(1) The peak 1% AEP flood level adjacent to the proposed development area is 969.6 mAHD in Lees Creek. The ground FFLs range between 994.5-996.2 mAHD, hence this control is achieved.
(a) All development including roads and internal property access should be located higher than 300mm above the highest recorded flood level. Any works are not to impede the flow of floodwaters to the extent that that occurring prior to development.	(2) As per Section 2.4, SMRC confirmed that no recorded flood level is available at the site. Although Barry Way is affected by shallow low hazard (H1) water in the 1% AEP flood event, the proposed site access roundabouts are located outside the 1% AEP flood extents, which is considered acceptable. As the site is predominately flood free in events up to and including the PMF, proposed works will not impede the flow of floodwaters.
(b) The use or storage of toxic or potentially polluting goods will not be permitted on flood liable land below the design floor level. Any proposal that involves the storage of such goods must be accompanied by an Emergency Management Plan.	(3) The proposed development is predominately outside the PMF extents, and further no use or storage of toxic or potentially polluting goods is proposed as part of the school development.
(c) Materials to be used for construction below the design floor level must be flood compatible.	(4) As discussed at (1). This control is not applicable.
(d) Council will not consent to any development on flood liable land where there is sufficient land above the flood standard on which to carry out the development.	(5) As discussed at (1). This control is not applicable.
(e) Where the land is below the flood standard any buildings must be constructed above the design floor level.	(6) As discussed at (1). This control is not applicable.
(f) Where extensive additions are proposed to lightweight buildings, Council may require the whole building to be raised to the design floor level.	(7) Additions to lightweight buildings are not proposed.
INFORMATION TO BE SUBMITTED WITH A DEVELOPMENT APPLICATION	
Once the levels and other details have been established, a detailed report must be submitted addressing the following issues:	

Snowy River DCP Requirement	Compliance Assessment
(a) That the proposed development will not increase the flood hazard or flood damage to other properties or adversely affect flood behaviour.	(8) As discussed at Section 4.6 the proposed development is located outside the flood extents and therefore will not cause offsite flood impacts.
(b) That the proposed development will not unnecessarily reduce flood storage in the floodplain.	(9) As discussed at (8).
(c) That the structural characteristics of the proposed building or work will withstand the force of flowing flood waters, including buoyancy forces and impact by debris.	(10) As discussed at (1). This control is not applicable.
(d) An adequate flood evacuation / contingency plan to show that the proposed development does not involve any risk to life or property or the environment in time of flood. Measures must be permanent, fail safe and maintenance free to ensure timely, orderly and safe evacuation in time of flood.	(11) Preliminary FERP comments are provided at Section 5. A detailed FERP is not considered necessary based on the immaterial flood affectation of the site in all events up to and including the PMF.
INFORMATION REQUIREMENTS FOR FLOOD LIABLE LAND	
The following information is to be submitted for development on flood liable land:	
(a) The level of the 1% AEP	(12) See Attachment C Map FL02.
(b) The velocity of flood waters at the 1%AEP flood level	(13) See Attachment C Map FL03.
(c) The level of the land	(14) See Attachment A.
(d) The flood level of any existing buildings.	(15) See Attachment A for existing building floor levels and Attachment C Map FL02, FL05 and FL08 for 1% AEP flood, 1% AEP flood with climate change, and PMF levels respectively.

7 Summary and Recommendations

A hydrologic and hydraulic model has been developed for the site using detailed site survey to assess local flood characteristics. The models were used to determine the existing flood conditions in the 1% AEP flood (with and without climate change) and PMF events. Assessment concluded that:

1. Proposed flood characteristics are expected to be consistent with existing conditions, and no differences are expected due to the proposed development.
2. The proposed development area of the site is flood free in the 1% AEP flood (with and without climate change) and PMF events.
3. The proposed high school development would have acceptable offsite flood impacts.
4. Flood risks to life on site are low, and both evacuation and shelter-in-place emergency response strategies are available to further mitigate flood risks.
5. All building finished floor levels are above the FPL and PMF levels.
6. The compliance assessment demonstrates the site can be developed in accordance with Council flood planning requirements.

Whilst the proposed development is not affected by flood hazards during all events up to and including the PMF event, we recommend that school management subscribes to the relevant flood warning systems and maintain communication with SES and local police at all times with respect to flood emergency response.

The proposed development has been designed to ensure compatibility with the existing floodplain environment. As the proposed development has been designed to achieve Council requirements, no further recommendations are considered necessary.

8 References

Bureau of Meteorology (2003), *The Estimation of Probable Maximum Precipitation in Australia: Generalised Short-Duration Method*.

Bureau of Meteorology (2021), *Rainfall IFD Data System*, www.bom.gov.au/water/designRainfalls/revise-ifd/?year=2016.

Commonwealth of Australia (Geoscience Australia) (2019), *Australian Rainfall and Runoff – A Guide to Flood Estimation*.

NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*.

NSW Government Environment & Heritage (2021) *eSPADE – NSW Soil and Land Information*, www.environment.nsw.gov.au/eSpade2WebApp.

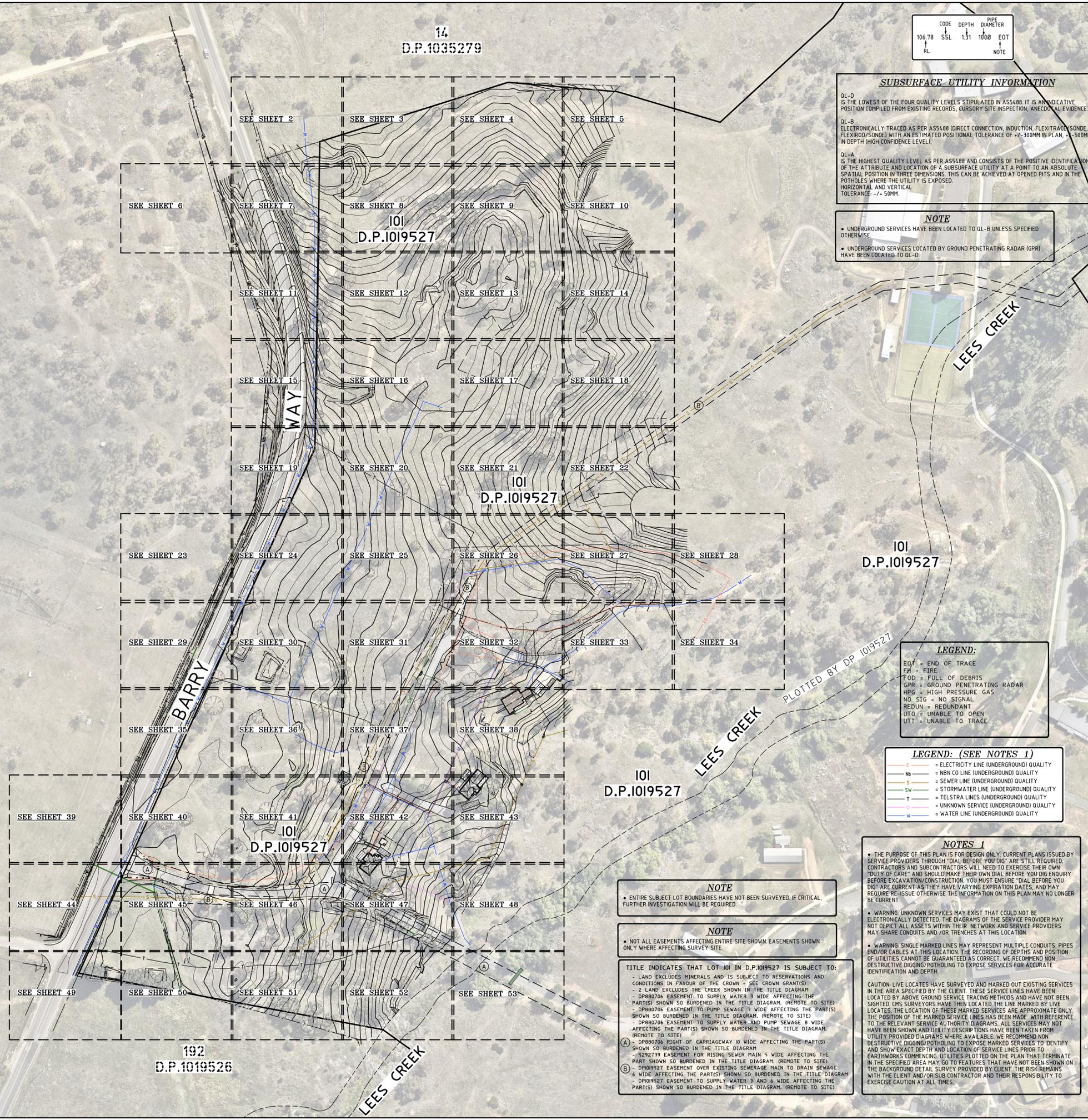
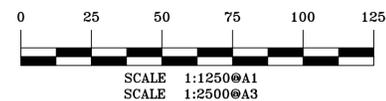
Snowy Monaro Regional Council (2013a), *Snowy River Local Environmental Plan (LEP)*.

Snowy Monaro Regional Council (2013b), *Snowy River Development Control Plan (DCP)*.

Weeks, W and Rigby, T (2016), *Blockage of Hydraulic Structures*, Chapter 6 of Book 6 in *Australian Rainfall and Runoff – A Guide to Flood Estimation*.

XP-RAFTS (1996), User's Manual.

9 Attachment A: Site Survey



CODE	DEPTH	PIPE DIAMETER
106.78	SSL	131
RL	1000	EOT
		NOTE

SUBSURFACE UTILITY INFORMATION

QL-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASS488. IT IS AN INDICATIVE POSITION COMPILED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-B ELECTRONICALLY TRACED AS PER ASS488 (DIRECT CONNECTION, INDUCTION, FLEXITRACE SONDE, FLEXIROD/SONDED) WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/- 300MM IN PLAN, +/- 500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A IS THE HIGHEST QUALITY LEVEL AS PER ASS488 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE POTHOLES WHERE THE UTILITY IS EXPOSED. HORIZONTAL AND VERTICAL TOLERANCE: +/- 50MM.

NOTE

- UNDERGROUND SERVICES HAVE BEEN LOCATED TO QL-B UNLESS SPECIFIED OTHERWISE.
- UNDERGROUND SERVICES LOCATED BY GROUND PENETRATING RADAR (GPR) HAVE BEEN LOCATED TO QL-D.

- NOTES**
- A PARTIAL BOUNDARY SURVEY HAS BEEN UNDERTAKEN.
 - IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.
 - AREA IS APPROXIMATE ONLY AND HAS BEEN CALCULATED BY TITLE DIMENSIONS. ALL TITLE DIMENSIONS OF THE LAND HAVE NOT BEEN CONFIRMED BY SURVEY. IF AREAS ARE CRITICAL WE RECOMMEND A BOUNDARY SURVEY FOR PUBLIC RECORD.
 - THIS SURVEY IS FOR DESIGN PURPOSES OF THE SUBJECT LAND ONLY. THIS PLAN MUST NOT BE USED FOR ANY OTHER MATTER, PURPOSE OR CONSTRUCTION SETOUT.
 - TREE SIZES ARE ESTIMATES ONLY.
 - THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF COLLIERS INTERNATIONAL PROJECT MANAGEMENT PTY LTD.
 - RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
 - EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
 - CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
 - CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
 - CONTOUR INTERVAL - 0.5 metre. SPOT LEVELS SHOULD BE ADOPTED.
 - POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
 - THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
 - DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.
 - COPYRIGHT © CMS SURVEYORS 2021.
 - NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.
 - ANY PERMITTED DOWNLOADING, ELECTRONIC STORAGE, DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.
 - THIS NOTICE MUST NOT BE ERASED.
 - THIS PLAN HAS BEEN PREPARED UNDER THE SUPERVISION OF A REGISTERED SURVEYOR.

Karl Robertson
 KARL ROBERTSON
 REGISTERED SURVEYOR BOSSI NUMBER 7835

HORIZONTAL DATUM:
 CO-ORDINATE SYSTEM: MGA (GDA94)
 MARKS ADOPTED: PM 1605 & SSM 95722

VERTICAL DATUM:
 DATUM: AUSTRALIAN HEIGHT DATUM (AHD)
 B.M. ADOPTED: PM 1605
 R.L. 1003.528 (CLASS LC)
 SOURCE: S.C.I.M.S. (7/05/2021)

LEGEND:

EOT = END OF TRACE
 FM = FIRE
 FOD = FULL OF DEBRIS
 GPR = GROUND PENETRATING RADAR
 HPG = HIGH PRESSURE GAS
 NO SIG = NO SIGNAL
 REDUN = REDUNDANT
 UTO = UNABLE TO OPEN
 UTT = UNABLE TO TRACE

LEGEND: (SEE NOTES 1)

- E = ELECTRICITY LINE (UNDERGROUND) QUALITY
- NS = NON SO LINE (UNDERGROUND) QUALITY
- S = SEWER LINE (UNDERGROUND) QUALITY
- SW = STORMWATER LINE (UNDERGROUND) QUALITY
- T = TELSTRA LINES (UNDERGROUND) QUALITY
- U = UNKNOWN SERVICE (UNDERGROUND) QUALITY
- W = WATER LINE (UNDERGROUND) QUALITY

NOTE

ENTIRE SUBJECT LOT BOUNDARIES HAVE NOT BEEN SURVEYED. IF CRITICAL FURTHER INVESTIGATION WILL BE REQUIRED.

NOTE

NOT ALL EASEMENTS AFFECTING ENTIRE SITE SHOWN. EASEMENTS SHOWN ONLY WHERE AFFECTING SURVEY SITE.

TITLE INDICATES THAT LOT 101 IN D.P.1019527 IS SUBJECT TO:

- LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANTS)
- 2 LAND EXCLUDES THE CREEK SHOWN IN THE TITLE DIAGRAM
- DP880704 EASEMENT TO SUPPLY WATER 9 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM. (REMOTE TO SITE)
- DP880704 EASEMENT TO PUMP SEWAGE 9 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM. (REMOTE TO SITE)
- DP880704 EASEMENT TO SUPPLY WATER AND PUMP SEWAGE 8 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM. (REMOTE TO SITE)
- DP880704 RIGHT OF CARRIAGEWAY 10 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
- 8292799 EASEMENT FOR RISING SEWER MAIN 5 WIDE AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM. (REMOTE TO SITE)
- DP109527 EASEMENT OVER EXISTING SEWERAGE MAIN TO DRAIN SEWAGE 6 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
- DP109527 EASEMENT TO SUPPLY WATER 9 AND 6 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM. (REMOTE TO SITE)

NOTES 1

- THE PURPOSE OF THIS PLAN IS FOR DESIGN ONLY. CURRENT PLANS ISSUED BY SERVICE PROVIDERS THROUGH "DIAL BEFORE YOU DIG" ARE STILL REQUIRED. CONTRACTORS AND SUBCONTRACTORS WILL NEED TO EXERCISE THEIR OWN "DUTY OF CARE" AND SHOULD MAKE THEIR OWN DIAL BEFORE YOU DIG ENQUIRY BEFORE EXCAVATION/CONSTRUCTION. YOU MUST ENSURE "DIAL BEFORE YOU DIG" ARE CURRENT AS THEY HAVE VARYING EXPIRATION DATES, AND MAY REQUIRE RE-ISSUE OTHERWISE THE INFORMATION ON THIS PLAN MAY NO LONGER BE CURRENT.
- WARNING: UNKNOWN SERVICES MAY EXIST THAT COULD NOT BE ELECTRONICALLY DETECTED. THE DIAGRAMS OF THE SERVICE PROVIDER MAY NOT DEPICT ALL ASSETS WITHIN THEIR NETWORK AND SERVICE PROVIDERS MAY SHARE CONDUITS AND/OR TRENCHES AT THIS LOCATION.
- WARNING: SINGLE MARKED LINES MAY REPRESENT MULTIPLE CONDUITS, PIPES END/OR CABLES AT THIS LOCATION. THE RECORDING OF DEPTHS AND POSITION OF UTILITIES CANNOT BE GUARANTEED AS CORRECT. WE RECOMMEND NON-DESTRUCTIVE DIGGING/POT-HOLING TO EXPOSE SERVICES FOR ACCURATE IDENTIFICATION AND DEPTH.
- CAUTION: LIVE LOCATES HAVE SURVEYED AND MARKED OUT EXISTING SERVICES IN THE AREA SPECIFIED BY THE CLIENT. THESE SERVICE LINES HAVE BEEN LOCATED BY ABOVE GROUND SERVICE TRACING METHODS AND HAVE NOT BEEN SIGHTED. CMS SURVEYORS HAVE THEN LOCATED THE LINE MARKED BY LIVE LOCATES. THE LOCATION OF THESE MARKED SERVICES ARE APPROXIMATE ONLY. THE POSITION OF THE MARKED SERVICE LINES HAS BEEN MADE WITH REFERENCE TO THE RELEVANT SERVICE AUTHORITY DIAGRAMS. ALL SERVICES MAY NOT HAVE BEEN SHOWN AND UTILITY DESCRIPTIONS HAVE BEEN TAKEN FROM UTILITY PROVIDED DIAGRAMS WHERE AVAILABLE. WE RECOMMEND NON-DESTRUCTIVE DIGGING/POT-HOLING TO EXPOSE MARKED SERVICES TO IDENTIFY AND SHOW EXACT DEPTH AND LOCATION OF SERVICE LINES PRIOR TO EARTHWORKS COMMENCING. UTILITIES PLOTTED ON THE PLAN THAT TERMINATE IN THE SPECIFIED AREA MAY GO TO FEATURES THAT HAVE NOT BEEN SHOWN ON THE BACKGROUND DETAIL SURVEY PROVIDED BY CLIENT. THE RISK REMAINS WITH THE CLIENT AND/OR SUB CONTRACTOR AND THEIR RESPONSIBILITY TO EXERCISE CAUTION AT ALL TIMES.

1	FIRST ISSUE	28/05/2021
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CLIENT:
 COLLIERS INTERNATIONAL
 PROJECT MANAGEMENT PTY LTD
 LEVEL 30, GROSVENOR PLACE,
 225 GEORGE STREET
 SYDNEY, NSW, 2000

SURVEY PLAN
 SHOWING DETAIL & LEVEL
 OVER PART OF LOT 101
 IN DP1019527
 No.207 BARRY WAY
 JINDABYNE, NSW, 2627

C.M.S. Surveyors Pty Limited

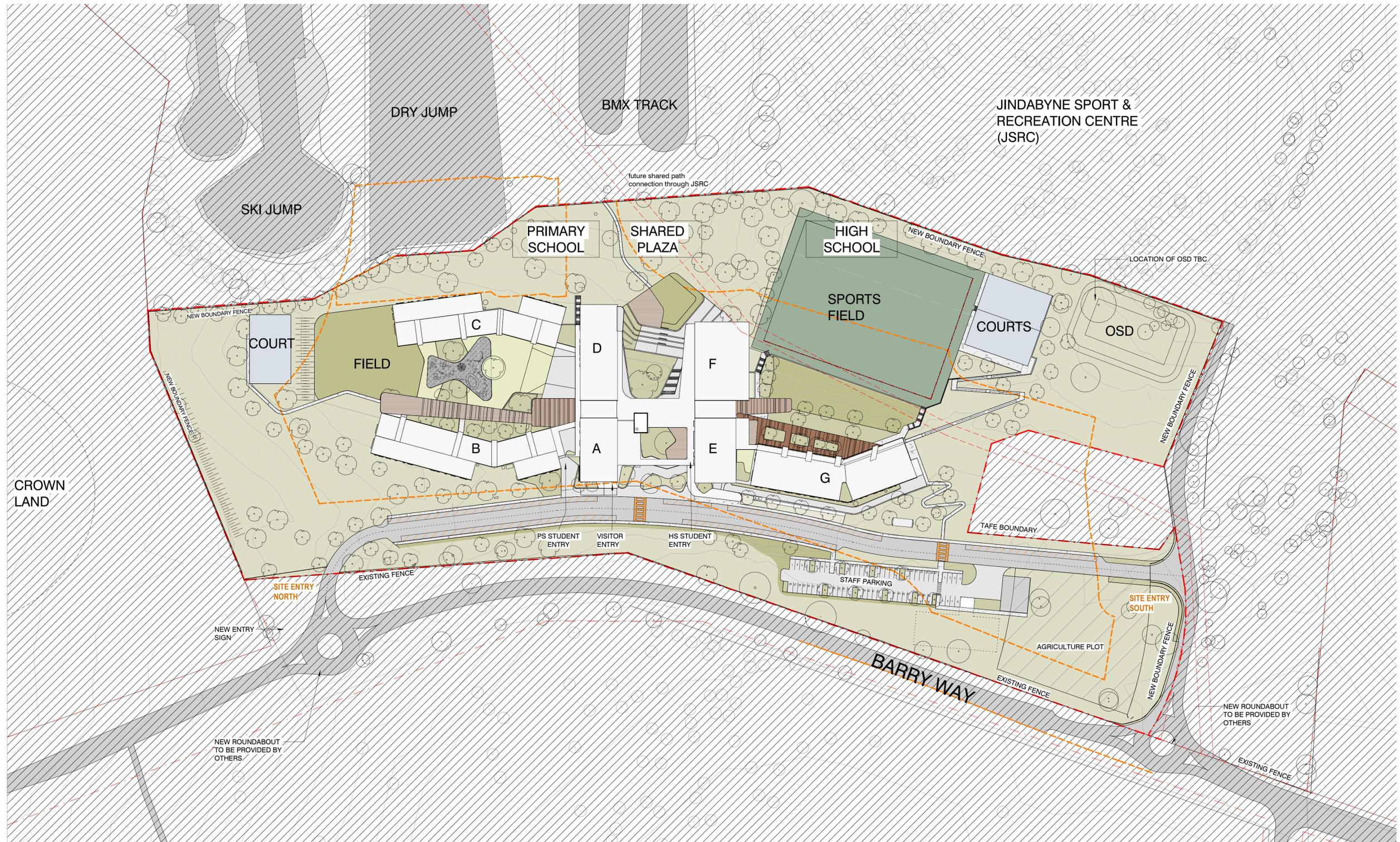
ACN: 096 240 201
 PO Box 463 Dee Why NSW 2099
 2/90A South Creek Road, Dee Why NSW 2099
 Telephone: (02) 9971 4822
 Facsimile: (02) 9971 4822
 E-mail: info@cmsurveyors.com.au

LGA: SNOWY MONARO REGIONAL SHEET 1 OF 52

SURVEYED HC/KK	DRAWN GP	CHECKED HC/KK	APPROVED DL/KR
SURVEY INSTRUCTION 20311	SCALE 1:1250 @ A1 1:2500 @ A3	DATE OF SURVEY 11-15/05/2021	ISSUE 1

DRAWING NAME: 20311detail
 CAD FILE: 20311detail.dwg

10 Attachment B: Proposed Site Layout



- LEGEND**
- ROAD
 - AREA OUTSIDE OF SCOPE
 - SITE BOUNDARY
 - LOT BOUNDARY
 - APZ - ASSET PROTECTION ZONE

SCHEMATIC DESIGN

ISSUE	DATE	SUBJECT	AUTHORISED
L	04/11/21	ISSUE FOR SSD REVISED	JE
K	29/10/21	ISSUE FOR COORDINATION	JE
J	12/10/21	TAFE LOCATION AMENDED	JE
I	23/07/21	ISSUE FOR SSD	BO
H	16/07/21	ISSUE FOR COORDINATION	BO
G	29/06/21	DRAFT SSD FOR REVIEW	BO
F	24/06/21	ISSUE TO TRAFFIC CONSULTANT	BO
E	21/06/21	ISSUE FOR WASTE	NWF
D	16/06/21	ISSUE FOR COORDINATION	BO
C	11/06/21	ISSUE TO SI	BO

LANDSCAPE ARCHITECT
 SITE IMAGE
 Landscape Architects
 Level 1, 3/5 Bapst Street
 Bradbury NSW
 T +61 2 8332 5600

SERVICES
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 North Sydney, 2060
 T +61 2 9033 8000

PROJECT MANAGER
 Colliers

STRUCTURE & CIVIL
 Cardno
 Level 9, The Forum
 203 Pacific Highway
 St Leonards, 2055
 T +61 2 9496 7700

This drawing should be read in conjunction with all relevant contracts, specifications and drawings. Dimensions are in millimetres. Levels are metres. Do not scale off drawings. Use figured dimensions only. Check dimensions on Site. Report discrepancies immediately.

Scale 1: 1000 @ A1

0 10000 20000 50000

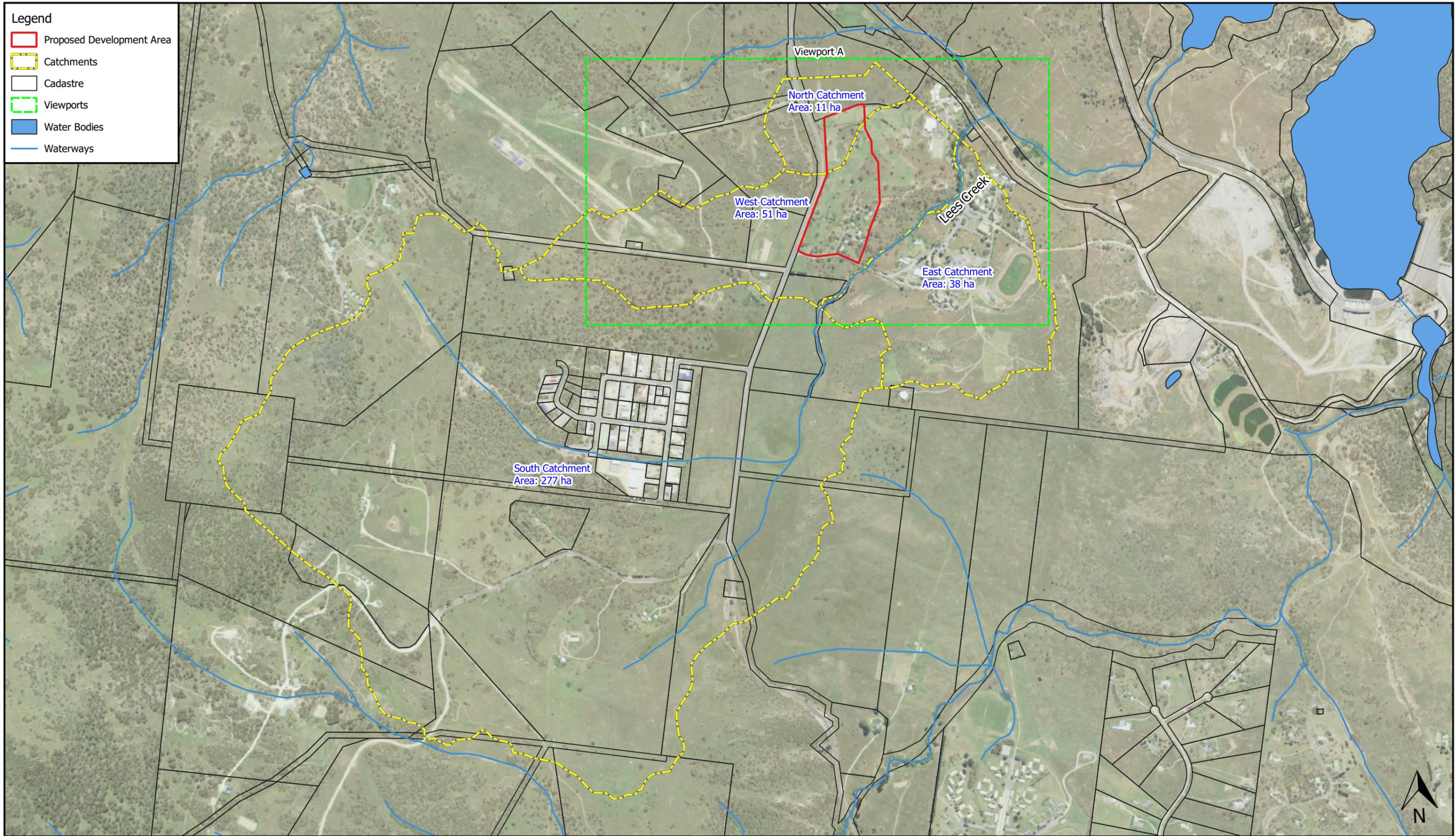
PROJECT
 JINDABYNE EDUCATION CAMPUS
 207 BARRY WAY
 JINDABYNE

CLIENT
 NSW GOVERNMENT
 Education
 AUTHORISED FOR ISSUE
 DIRECTOR DATE

ARCHITECT
 djrd architects
 T +612 9319 2955
 ABN: 49 942 921 969
 Nominated Architects:
 Andrew Hipwell 6562
 Daniel Beekwilder 6192
 63 Myrtle Street
 Chippendale NSW 2008
 Sydney Australia
 djrd.com.au

DRAWN BY	SCALE	SHEET SIZE	ORIGIN DATE
Author	As indicated	A1	05/03/21
DESCRIPTION			
PROPOSED SITE PLAN			
PROJECT No	DRAWING No	REVISION	
20 415	SSDA.0101	L	

11 Attachment C: Flood Assessment Mapset



0 100 200 300 400 500 m

1:12500 @ A3

Notes:
 - Aerial from Google Satellite (2021).
 - Cadastre, waterways and water bodies from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:

Catchment Plan



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout
- Water level Contours (mAHD)

Water Depth (m)

- 0.10 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.50
- > 2.50

0 40 80 120 160 200 m

1:4000 @ A3
Viewport A

Notes:
 - Proposed development layout from DJRD Architects (June 2021).
 - Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
**1% AEP Critical Duration Storm - Existing Scenario
 Water Level & Water Depth**



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout

Water Velocity (m/s)

- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- > 2.5

0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

Notes:

- Proposed development layout from DJRD Architects (June 2021).
- Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
- Aerial from Nearmaps (2017).
- Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
**1% AEP Critical Duration Storm - Existing Scenario
 Water Velocity**

FL03	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date

Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout

ARR Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6



0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

- Notes:**
- Proposed development layout from DJRD Architects (June 2021).
 - Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.
 - Flood hazard categories based on Australian Rainfall and Runoff (2019) "A Guide to Flood Estimation" combined flood hazard categories.

Map Title / Figure:
**1% AEP Critical Duration Storm - Existing Scenario
ARR Flood Hazard Categories**

FL04	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout
- Water level Contours (mAHD)

Water Depth (m)

- 0.10 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.50
- > 2.50

0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

- Notes:**
- Proposed development layout from DJRD Architects (June 2021).
 - Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
1% AEP Climate Change Critical Duration Storm - Existing Scenario Water Level & Water Depth



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout

Water Velocity (m/s)

- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- > 2.5

0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

Notes:
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
1% AEP Climate Change Critical Duration Storm - Existing Scenario Water Velocity

FL06	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout

ARR Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

- Notes:**
- Proposed development layout from DJRD Architects (June 2021).
 - Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.
 - Flood hazard categories based on Australian Rainfall and Runoff (2019) "A Guide to Flood Estimation" combined flood hazard categories.

Map Title / Figure:
1% AEP Climate Change Critical Duration Storm - Existing Scenario ARR Flood Hazard Categories

FL07	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date



0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

- Notes:
- Proposed development layout from DJRD Architects (June 2021).
 - Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
 - Aerial from Nearmaps (2017).
 - Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
**PMF Critical Duration Storm - Existing Scenario
Water Level & Water Depth**

FL08	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date



Legend

- Proposed Development Area
- Cadastre
- Proposed Development Layout

Water Velocity (m/s)

- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- > 2.5

0 40 80 120 160 200 m

1:4000 @ A3

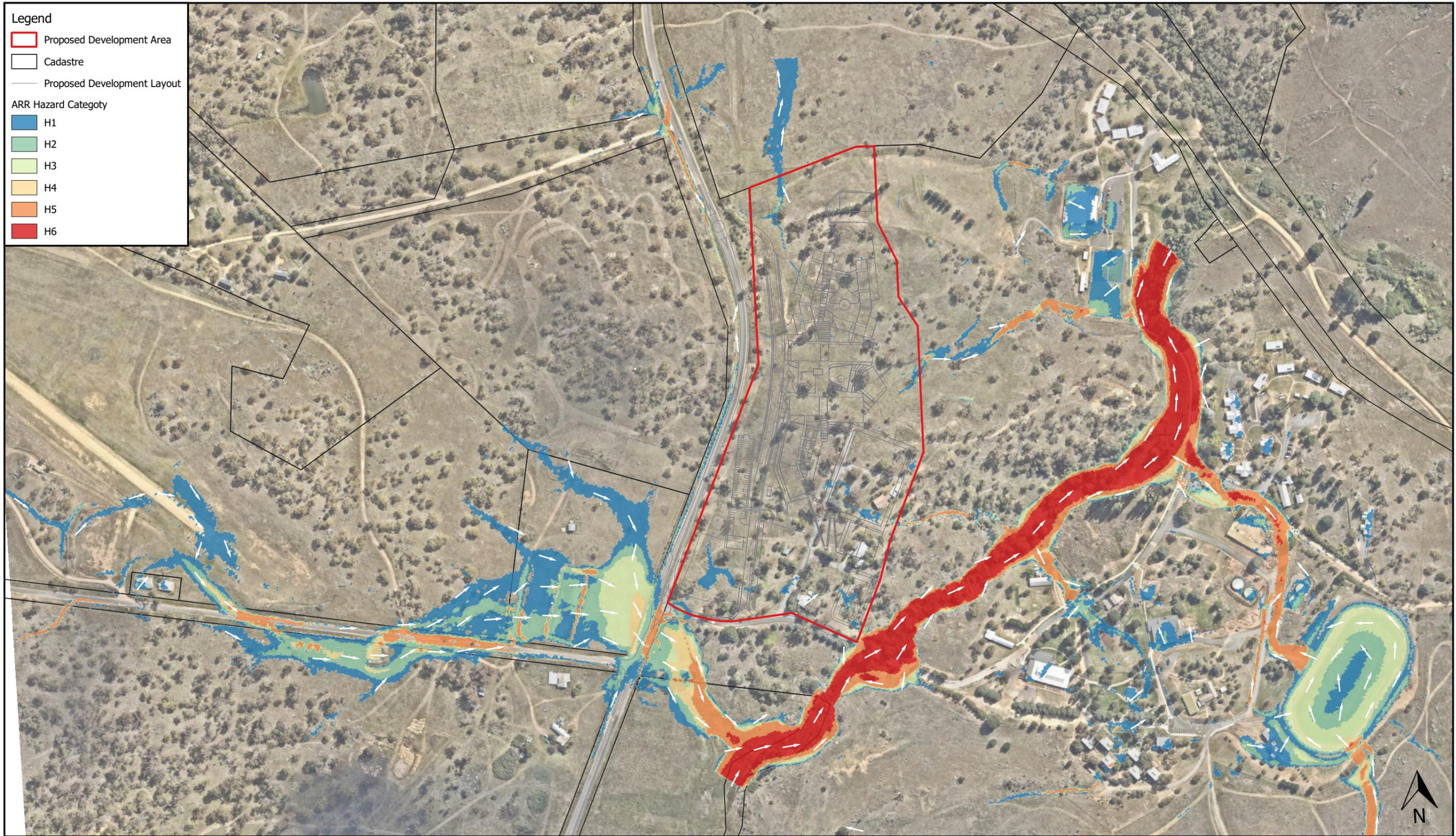
Viewport A

Notes:

- Proposed development layout from DJRD Architects (June 2021).
- Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
- Aerial from Nearmaps (2017).
- Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.

Map Title / Figure:
**PMF Critical Duration Storm - Existing Scenario
 Water Velocity**

FL09	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date



0 40 80 120 160 200 m

1:4000 @ A3

Viewport A

Notes:

- Proposed development layout from DJRD Architects (June 2021).
- Flood results are considered valid for the subject site only and any offsite flooding may not be accurate.
- Aerial from Nearmaps (2017).
- Cadastre from NSW Spatial Services (2021) 'Clip & Ship' SIX Maps website.
- Flood hazard categories based on Australian Rainfall and Runoff (2019) "A Guide to Flood Estimation" combined flood hazard categories.

Map Title / Figure:
**PMF Critical Duration Storm - Existing Scenario
ARR Flood Hazard Categories**

FL10	Map
207 Barry Way, Jindabyne, NSW	Site
Jindabyne Central School	Project
Flood Assessment	Sub-Project
School Infrastructure NSW	Client
10/12/2021	Date