Job Number: 167385-01



Level 11, 345 George Street, Sydney NSW 2000 **T (02) 9241 4188** F (02) 9241 4324 E sydney@northrop.com.au ABN 81 094 433 100

8 April 2019

Mr Rachmat Djajadikarta

Altre Partners Suite 110, 350 George Street Sydney, NSW, 2000

Dear Rachmat,

RE: Extension to The Arbour, Berry – Flood Management and Site Servicing Strategy

Northrop Consulting Engineers have been commissioned by Mbark Pty Ltd to prepare a Preliminary Flood Management and Site Servicing Strategy Letter for preliminary advice for the proposed extension to The Arbour located at Lot 6 DP1204186, 10 Victoria Street Berry.

Site Description

The proposed development is located within Lot 6 DP1204186, 10 Victoria Street in Berry NSW within the Shoalhaven City Council Local Government Area (LGA). It is an extension of the existing retirement village located in the centre of this parcel of land. The proposed extension site is located to the north of the retirement village along the northern site boundary. The site is 0.77 hectares and is bound by Victoria Street to the north, a retirement village to the east, Pepper Farm Drive to the west and remaining Lot 6 land to the south. Refer to Figure 1 for locality plan.



Figure 1 – Site Locality (Source: Sixmaps 2018)



Site Topography

The existing site is predominantly grassland surrounded by trees. Contour information provided in site survey by Johnson Procter Surveyors for the subject site area indicates the site falls towards the southwest from a maximum RL of approximately 12.6m AHD at the northeast corner to a minimum RL of approximately 7.0m AHD at the southwest corner. No existing buildings are located on site.



Figure 2 – Existing Site Topography

Refer Appendix A - survey plan Ref. 1113FRONT prepared by John Procter Surveyors PTY Limited for more details.

Proposed Development

The proposed development is an extension of the existing retirement village. It comprises of construction of two (2) private roads and eleven (11) single residential dwellings. This will include new connection of services including sewer, water, gas, electricity and telecommunication, as well as construction of new stormwater drainage network.

Refer Appendix B for proposed development layout.



Existing Infrastructure Services

This section describes the existing active services that have been identified as part of our services investigation. The investigation is based on a review of Dial Before you Dig (DBYD) information requested on 30th November 2018 and existing services plans for The Arbour retirement village development.

The DBYD request notified the following utilities:

Seq. No.	Authority Name	Phone	Status
78129822	Endeavour Energy	0298534161	NOTIFIED
78129824	NBN Co, NswAct	1800626762	NOTIFIED
78129825	Shoalhaven Water	0244293214	NOTIFIED
78129823	Telstra NSW, South	1800653935	NOTIFIED

A summary sketch of DBYD plans are provided in Appendix C.

Existing Sewer Infrastructure

DBYD plans and existing services plans identify existing sewer infrastructure owned and maintained by Shoalhaven Water. The following sewer infrastructure is located in vicinity of the site:

- A sewer main along Victoria Street located at the northeast corner of the site;
- A private pressure sewer lines along Pepper Farm Drive at the western boundary connecting into the Shoalhaven Water pumping Station.

Existing Water Infrastructure

DBYD plans existing services plans identify existing water infrastructure owned and maintained by Shoalhaven Water. The following water infrastructure is located in the vicinity of the site:

- A water main along the northern boundary of the site on Victoria Street.
- Private water lines along Pepper Farm Drive at the western boundary.

Existing Gas Infrastructure

Existing services plans identify existing gas infrastructure owned and maintained by The Arbour. The following gas infrastructure is located in the vicinity of the site:

• A gas line along Pepper Farm Drive at the western boundary to the gas tank located at the northwest corner of the site.

Existing Electrical Infrastructure

DBYD plans identify existing power supply network owned and maintained by the Endeavour Energy. The following electrical infrastructure is located in the vicinity of the site:

• Electrical cables along the length of Victoria Street.

Existing Telecommunications Infrastructure

DBYD plans identify existing telecommunications infrastructure owned and maintained by telecommunications service providers (including Telstra and NBN). The following telecommunications infrastructure is located in the vicinity of the site:



- NBN conduits and pits along Pepper Farm Drive;
- NBN conduits and pits along the length of Victoria Street;
- Telstra conduits and pits along Pepper Farm Drive;
- Telstra conduits and pits along the length of Victoria Street.

Proposed Services

This section describes the connection of proposed services to the existing services that have been identified as part of our services investigation.

Proposed Sewer

The closest point of connection to Shoalhaven City Council's gravity sewer main is located in Victoria Street. In order to connect at this location there will need to be a private low-pressure system similar what has been installed within the existing section of The Arbour. Connection at this location will be subject to application to Shoalhaven City Council.

Proposed Water (Potable and Fire Service)

It may be feasible to connect into the existing private potable water and fire service in Pepper Farm Drive for the additional 11 dwellings subject to assessment of the capacity of this connection. An alternative connection to Shoalhaven City Council's water main is via the existing watermain in Victoria Road subject to application to Shoalhaven City Council.

Proposed Gas

The existing gas tank currently located on the site will need to be assessed to determine if there is enough capacity to service the additional 11 dwellings. Alternative gas supply may include the installation of a new tank to service the dwelling or gas bottles to service individual dwellings.

Proposed Electrical

The electrical supply for the existing retirement village is from the Princes Highway on the south west side of the site, however the closet point of connection for the proposed site is from the HV cables in Victoria Street, connection at this location will be subject to application to Endeavour Energy assuming there is sufficient capacity in the pad-mount substation located to the east within Lot 1008 DP1107175.

Proposed Communication

It may be feasible to connect to the existing communication network (Telstra and NBN) in Pepper Farm Drive subject to application to the service authorities. Further assessment of the existing infrastructure in Victoria Road and Pepper Farm Drive will need to be undertaken to establish the best connection point.

Flooding

A flood certificate has been issued by Shoalhaven City Council dated 11th December 2018, stating that the parcel of land is affected by the 1% AEP flood event. As such, flood planning measurements must be carried out in accordance with Shoalhaven City Council DCP Chapter G9: Development on Flood Prone Land. Post to issuing the flood certificate, a flood hazard

category map and flood levels at specific locations have been provided by Council's flood engineer Tanvir Ahmed. Refer Appendix D for flood information from Council.

NORTHROP

The majority of the proposed development extent is located outside of the hazard areas in Council's flood hazard category map. A minor portion of two dwellings along the southern extent and minor public road areas are encroaching the 'low hazard floodway' and 'low hazard flood storage' areas. The southern end of the proposed new road encroaches a minor 'high hazard floodway' area which is isolated from the main high hazard floodway. Email from Council's flood engineer Tanvir Ahmed dated 26/02/19 has confirmed that 'any type of encroaching to high hazard floodway is not recommended by the Council except the isolated one'.

An assessment of the latest extension development layout against the Development Control Plan (DCP) of Shoalhaven City Council, specifically development controls on flood prone land has been undertaken below, to identify main design criteria from Council's guidelines and propose design solutions which are deemed compliant.

Flood Planning Levels

As per the requirements specified in the pre-DA meeting, the finished floor level of the proposed retirement village development must be set above the PMF flood levels or 1% AEP +0.5m freeboard, whichever is higher. The following measures may be adopted to achieve Council's FPL requirements:

- Maintain existing natural surface levels for areas located outside of flood hazard category map;
- Propose filling of land for areas encroaching the low hazard floodway and low hazard flood storage areas.

Flood Management General Controls

Shoalhaven City Council DCP Chapter G9 have developed general performance criteria for developments on flood prone land to minimize flood impacts and risks to life and properties as below:

 assessing the proposed development against risks to life and property resulting from any adverse hydraulic impacts; The development will not adversely affect the integrity of floodplains and floodways, including riparian vegetation, fluvial geomorphologic environmental processes and water quality. 	result in any adverse impact on floodwater characteristics. Excavation may be carried out to compensate the loss of flood storage volume due to filling on site in future detailed design. A hydraulic impact assessment can be prepared upon Council's request to determine any possible impacts to floodwater and adjacent/downstream properties resulted by the proposed development in future detailed design.
 The structural characteristics of any building or work that are the subject of the application are capable of withstanding flooding in accordance with the requirements of the Council; The development will not become unsafe during floods or result in moving debris that potentially threatens the safety of people or the integrity of structures; Potential damage due to inundation of proposed buildings and structures is minimised. 	Setting the finished floor levels of the proposed development above the PMF levels or 1% AEP + 0.5m, whichever is higher, will prevent any damages or impacts caused by floodwater to building components or structural soundness.
 The development will not obstruct escape routes for both people and stock in the event of a flood; The development will not unduly increase dependency on emergency services. 	An emergency evacuation strategy must be prepared in future detailed design which may incorporate the following strategies: - Shelter in place - Appropriate evacuation route

Fill or Excavation on Site

In accordance with Shoalhaven City Council DCP Chapter G9, filling or excavation within the proposed development area shall not have significant impact on flood behavior, conveyance and storage capacity, as well as surrounding properties or structures and the environment in the specific area where the development is proposed.

Performance Criteria	Design Solution	
 High hazard floodway areas are kept free of fill and/or obstructions. 	The extent of the proposed development will be located outside of the high hazard floodway area, except minor overlap with a 'high hazard floodway' area isolated from the main high hazard floodway at the southern end of the proposed road. Confirmation has been sought from Council's flood engineer Tanvir Ahmed, suggesting that 'any type of encroaching	



		to high hazard floodway is not recommended by the Council except the isolated one'.
•	The proposed fill or excavation will not unduly restrict the flow behaviour of floodwaters; The proposed fill or excavation will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity, including adjoining land; The proposed fill or excavation will not exacerbate erosion, siltation and destruction of vegetation caused by floodwaters flowing	Minor volume of fill along southern extent will be proposed during future design stage. The volume of fill is not expected to be more than 1% of the 2050 flood volume. Excavation may be carried out to compensate the loss of flood storage volume due to filling on site in future detailed design.
	on the land.	
•	The proposed fill or excavation will not be carried out on flood prone land if sufficient flood free area is available for development within the subject property.	The majority of the proposed development will be located outside the flood hazard category map area provided by Council. Filling will only occur at minor areas.
•	The proposed excavation does not create new habitable rooms, non-habitable storage areas or carparks with floor levels below the existing ground level.	No excavation works will be proposed within areas encroaching Council's flood hazard category map.

Based on the assessment of the latest architectural layout against Council's performance criteria, it is anticipated that no significant issues will be encountered during the detail design of earthworks and design levels. The proposed development will be generally compliant with Shoalhaven City Council DCP Chapter G9: Development on Flood Prone Land.

The detailed design solution will be developed throughout the process of the Development Application taking into account any comments from Council.

We trust you find this information satisfactory. Feel free to contact me if you have any questions or require further information.

Yours faithfully

Phillip Cornish Senior Civil Engineer BE DipEngPrac (Civil) NORTHROP CONSULTING ENGINEERS



APPENDIX B - ARCHITECTURAL LAYOUT



PROJECT NO.

18027

PRINT DATE:

SITE:

5/4/19

VICTORIA STREET, BERRY

PROJECT STATUS: SCC APPLICATION CLIENT: MBARK PTY LTD

DRAWING TITLE :

PROJECT NAME :

FLOOR PLAN

GA Plans

NOTE The Builder shall check all dimensions and levels on site prior to construction. Notify any errors, discrepancies or omissions to the architect. Refer to written dimensions only. Do not scale drawings. Drawings shall not be used for construction purposes until issued for construction. This drawing reflects a design by SATURDAY STUDIO and is to be used only for work when authorised in writing by SATURDAY STUDIO.

Saturday Studio

All boundaries and contours are subject to survey drawing **BY SURVEYOR**. All levels to Australian Height Data. It is the contractors responsibility to confirm all measurements on site and locations of any services prior to work on site.

All documents here within are subject to Australian Copyright Laws.





	ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH ARCHITECT AND BUILDER BEFORE COMMENCING SHOP DRAWINGS OR SITE WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.	NORTHROP	PROJECT
OF THIS DRAWING REMAINS WITH NORTHROP		Sydney Level 11, 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100	

INDSOR DRIVE
TRN
W NBN NBN TS IS
S S S S S S S S S S S S S S S S S S S
LE GONDANA LE
5
TURNING BAY
NOT FOR CONSTRUCTION
DRAWING TITLE JUB NUMBER REVISION
DRAWING SHEFT SIZE - A1

