# Flood Impact Assessment

17 Playfair Road, North Curl Curl

59918041

Prepared for Pos Simson

3 December 2018





## Cardno<sup>®</sup>

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## **Document Information**

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## 1 Introduction

Cardno was commissioned to undertake an overland flow impact assessment for the proposed development to support a two lot subdivision at 17 Playfair Road, North Curl Curl. This report details the extent and behaviour of existing flooding and an assessment on the impact of the proposed development. The general location of the site is shown in **Figure 1-1**.



Figure 1-1 Locality Plan (Aerial Image Source: Nearmap)

The site is located within a catchment to the north of Curl Curl Lagoon and on the eastern side of Playfair Road. The site is a residential lot and currently has an existing double storey, residential building and associated buildings located within the existing boundaries. Site conditions as determined from detailed ground survey indicate ground elevations range from approximately RL 16.7 m AHD in the north west corner to 14.9m AHD along the southern boundary. An existing 675mm Council stormwater drainage pipe runs from a diversion pit on Playfair Road and traverses diagonally through both 15 and 17 Playfair Road.

Cardno reviewed the availability of existing models from Council and it is our understanding that while there is a Council flood model for Greendale Creek/ Curl Curl Lagoon, there is no overland flow study which covers the site of interest.

This report details the flooding and stormwater behaviour for the proposed development and flood mitigation.

## 1.2 Scope of Works

The objective of the study is to undertake an assessment of flooding in the vicinity of the subject site and provide advice for the proposed development in order to assess the compliance with Council's requirements. The scope of works included:

- > Review and update existing models;
- Develop design options for decommissioning and relocating of the existing 675mm pipe traversing 15 and 17 Playfair Road;
- > Assessing overland flow paths and downstream system constraints;
- > Assess impacts of design options and recommend a solution that complies with Council's requirements;
- > Identifying flood hazard/flood risk for the proposed development and minimising these risks through design or risk management protocols.

## 2 Available Data

The data available for the study is outlined in the following sections:

## 2.1 Acor Consultant Report and Flood Models

Acor consultants undertook a flood study of the site in 2016 including the following:

- > A DRAINS model to simulate hydrology and hydraulic behaviour in the pipe network system;
- > A TUFLOW model to simulate hydrology and flood behaviour in the catchment for pre and post development scenario.

## 2.2 Pre-lodgement Meeting notes from Northern Beaches Council

Cardno was provided with pre-lodgement meeting notes issued by Northern Beaches Council (reference SPLM2016/0001, dated 2 September 2016) which outlines Council's advice for stormwater requirements related to the proposed decommissioning and removal of the stormwater drainage traversing the properties at 15 and 17 Playfair Road.

Further to this, Cardno was later provided with Pre-lodgment notes from the meetings held on 24 May 2018 and 4 September 2018 with comments regarding demolition of the existing buildings and subdividing the lot into two lots. The comments were updated later via an email received on 18 September 2018.

All the comments and advice received from Council are provided in Appendix A.

## 2.3 Ground Survey

A detailed survey of ground levels on the site was undertaken by Lawrence Group, reference 163319, dated 11 January 2016 (updated drawing by Veris Drawing No. DETL-001/D dated 21/03/2018) is included in **Appendix B**.

A digital elevation model (DEM) was generated using LiDAR (Light Detection and Ranging) aerial survey obtained from Acor's TUFLOW model for the site and surrounding catchment.

### 2.4 Proposed Development

The proposed development that is the subject of the subdivision DA is limited to the relocation of the existing stormwater drainage pipe system traversing 17 Playfair Road. The relocation and provision of a new pit and pipe network is detailed on drawings 59918041-DA-000, DA-001, DA-002, DA-003 and DA010, included in **Appendix C**. The relocation of the stormwater pipe is to allow subdivision of the site into two (2) Torrens Title residential lots.

## 2.5 Aerial Photography

All aerial photography within this report are used under licence from Nearmap.

## 3 Flood Modelling

Flood modelling has been undertaken at the subject site for the existing and proposed scenario using DRAINS for the hydrological assessment and TUFLOW for the hydraulics assessment. A 1D/2D TUFLOW model has been used with the one-dimensional component utilised to define the channels, stormwater pipe network and culverts in the study area. The two-dimensional grid was utilised to define the overland flows such as flows along streets and through properties.

A detailed description of the hydrological and hydraulic modelling assessment is provided in the following sections of this report.

## 3.1 Model Setup

The previous flood models developed for the site were reviewed and updated to suit Council's requirements for this study. In order for this study to assess the impacts of the site and any impacts on Council's stormwater drainage system capacity both upstream and downstream, the flood model was established as a regional model for the broader catchment. The model setup is described in the following sections.

#### 3.1.1 Hydrology Model

DRAINS software has been used to model the catchment hydrology to determine catchment flows for the Council stormwater network (provided by Acor). The DRAINS model represents Council's stormwater network for the entire catchment upstream of the development site and downstream to Curl Curl Lagoon. Catchment areas draining to each pit and associated parameters have been setup and the model run using the ILSAX hydrology method to derive flow hydrographs (time series) for the 20%, 5% and 1% Annual Exceedance Probability (AEP) events.

### 3.1.2 Hydraulic Model Extent and Grid

A 1D/2D TUFLOW hydraulic model has been used which extends upstream to Quirk Street and downstream to south of Pitt Rd. The model extents and pipe network setup are shown in **Figure 3-1**.



Figure 3-1 Pipe network and model extent

The model extent is appropriate for this study as it is beyond the scope of this assessment to model all pit and pipe networks in adjacent catchments and the areas down to the lagoon. Due to the steepness of the terrain and pipe network downstream of Pitt Rd, there would not be any tailwater impacts associated with interaction with adjacent pipe networks or flood levels in Curl Curl Lagoon. As such, accurate representation of the development site and upstream and downstream networks is established with the chosen model extents.

The finite element grid forms the basis for TUFLOW modelling where each grid cell has applied characteristics such as elevation, slope, roughness etc. A 1m x 1m grid size was selected for the model and was considered appropriate for urban catchments of this scale. This grid size allows a finer and more accurate representation of the flows adjacent to the subject site.

The model grid has been setup with the following terrain parameters:

- > A digital elevation model (DEM) was generated using LiDAR (Light Detection and Ranging) aerial survey obtained from Acor's TUFLOW model for the surrounding catchment area and detailed survey data for the development site;
- Review of the 2016 detailed survey showed some difference to the ALS ground levels, thus the detailed ground survey was used for the subject site;
- Existing building footprints on the subject site and adjacent properties were modelled as blockages to ensure accurate representation of flow paths around buildings;

#### 3.1.3 Stormwater Pit and Pipe Network

The stormwater pit and pipe network has been setup in the 1d network in the TUFLOW model with the following parameters:

- > The existing 675mm pipe alignment and invert levels have been adjusted based on survey details of the site;
- > Pit inlet rating curves has been derived using HEC-22 spreadsheet for each pit type;
- > A pit blockage factor of 20% for on-grade pits and 50% for sag pits has been applied to pit inlet curve data;
- > Pit losses have been modelled using the 'Engelhund' manhole loss approach within TUFLOW which determines losses based on velocities and pit configuration; and,
- > Pipe blockage factors have not been accounted for in this hydraulic model.

#### 3.1.4 Roughness Coefficients

Manning's 'n' roughness coefficients were applied within the TUFLOW model to regions created in a TUFLOW Materials file. This file bounds regions within the model area and applies a bed resistance value, in this case, a Manning's 'n' value. TUFLOW adopts these values for each 1m x 1m grid cell within the specified regions. Each of these regions has adopted the Manning's values set out below in **Table 3-1**.

#### Table 3-1 Model Surface Roughness values

Surface Material Regions	Manning's "n" value
Roads and carpark (hardstand)	0.02
Residential development lots	0.08
Vegetated Creek	0.08
Concrete Pipes	0.012

#### 3.1.5 Boundary Conditions

The upstream boundary condition utilises a flow versus time relationship to model the inflows to the TUFLOW model. The boundary condition distributes flow in quantity and direction across the cells based on their topography, bed roughness and whether upstream or downstream conditions control the flow. A peak flow hydrograph generated by the DRAINS model (provided by Acor) was applied directly to the inflow pits in the TUFLOW model. The hydrograph was determined based on the total combined flow of the catchments located upstream of the model.

In addition, local point inflows have been applied to the model within the model boundary to account for subcatchment flows arriving at each pit within the model extents. The inflows have been extracted from the DRAINS model.

The downstream boundary was established as a free outflow boundary with normal depth based on the slope of the land and the grade in the pipes. This boundary type was chosen due to the steepness of the terrain and pipe network downstream of Pitt Rd to Curl Curl Lagoon. As such there would not be any tailwater associated with flood levels in Curl Curl Lagoon or within the pipe network.

## 3.2 Existing scenario

The TUFLOW model was run for the 20%, 5% and 1% AEP events utilising flow hydrographs extracted from the DRAINS model. The model was run for the 2 hour critical storm duration event for a simulation length of 3 hours to allow the flows to reach their peak and 'fill' the model and then recede. The peak flood extents were determined based on critical duration. The TUFLOW output results for the existing scenario have been attached in **Appendix F**.

The results show that the existing site and surrounding properties are flood affected for all design flood events modelled. There are two overland flow paths through the existing site, one from the northwest from Playfair Rd and other from the north of the site through the upstream properties. Both flow paths traverse through 15 Playfair Rd from upslope before flowing through the subject property. There is ponding within the rear yard of the subject property due to the downstream property having finished ground levels higher than the ground levels in the rear yard of 17 Playfair Rd.

Figure 3-2 shows the configuration of the existing scenario as applied in the TUFLOW model.



Figure 3-2 TUFLOW Model setup for the existing pipe network and overland flow through subject site

## 3.3 Proposed Scenario – Subdivision and Drainage Network Diversion

The existing scenario flood model was revised to represent the proposed pipe diversion for the development. The proposed development is predicated on the relocation of the existing stormwater drainage pipe system traversing 17 Playfair Road. The relocation and provision of a new pit and pipe network is detailed on drawings 59918041-DA-000, DA-001, DA-002, DA-003 and DA010, included in **Appendix C**. The relocation of the stormwater pipe allows subdivision of the site into two (2) Torrens Title residential lots.

In summary, the proposal includes:

- Deviation of the existing 675mm diameter pipe within 17 Playfair Rd and increasing the size to a 750mm diameter along and parallel to the northern boundary and then traversing the rear of the development site on the western side of the sewer network, connecting to the existing pipe located on the southern boundary;
- > Design finished surface levels to provide minimum 300mm cover along the alignment of the pipe;
- Provision of an easement over the asset (1.8m wide.along the northern boundary and 3m wide through the rear of the properties) for access to drainage pits;

The configuration of the proposed scenario as applied in the TUFLOW model is indicated on the drawings included in **Appendix C**.

Figure 3-3 shows the configuration of the proposed scenario as applied in the TUFLOW model.



Figure 3-3 TUFLOW Model setup for proposed pipe network and overland through subject site

## 3.4 Ultimate Scenario – Future development of dwellings

Following the pre-lodgement meeting of 4 September 2018, Council requested that the impact of the development with future dwellings be examined to demonstrate that the potential impacts of the site are acceptable. The Existing and Proposed TUFLOW models were revised further to address Council's Pre-lodgement Advice and also the comments received from Council in May and September 2018 (**Appendix A**).

The proposed dwellings are shown on the architectural drawings (**Appendix D**). They consist of two similar buildings, Block 'A' and Block 'B', each with a driveway and double garage on the Playfair Rd frontage and a dwelling which has a split level towards the rear of the building. The front of the properties will be constructed on ground to just past the garage section and then the remainder of the dwelling will be a suspended slab on pier arrangement with suspended decks around the outside of each dwelling.

Due to the changes to the buildings on the site and overland flow paths in the future with new dwellings, it was necessary to make adjustments to the modelling to provide a more accurate representation of the existing flow paths on the site and surrounding areas.

As such, the Existing Scenario was updated to include fences for the surrounding block. Existing fences are largely solid wood paling fences and have been modelled with 80% blockage, to allow some porosity to maintain flow through the fences. This is deemed more realistic as the fences will direct flows and store flows behind them to a degree before continuing along flow paths. As noted above, flow on 17 Playfair Rd comes from flows which spill from Playfair Rd in front of 15 Playfair Rd and through the front of 15 Playfair Rd before flowing onto the subject property. Flows also enter the rear yard of 17 Playfair Rd from 15 Playfair Rd and upslope properties. As such, fences across these flowpaths will influence the hydraulic behaviour.

**Figure 3-4** shows the Existing fences included in the hydraulic model. The Revised Existing Scenario established the new baseline for the purpose of this assessment.



Figure 3-4 Existing Fences Included in the Tuflow Model (Revised Existing Scenario)

The Ultimate Scenario was set up based on the Revised Existing Scenario through applying the following:

Deviation of the existing 675mm diameter pipe within 17 Playfair Rd and increasing the size to a 750mm diameter along and parallel to the northern boundary and then traversing the rear of the development site on the western side of the sewer network, connecting to the existing pipe located on the southern boundary (Similar to Proposed Scenario);

- > The Proposed buildings and driveways as shown on architectural plans were represented in the hydraulic model, with the front half of the buildings blocked. It was assumed that the other half of the building will be built on piers to allow flow under the building;
- > Proposed conditions fences for the study site were included in the model;
- > The 3D proposed terrain was included in the hydraulic model. The proposed terrain would provide the required cover for the diverted drainage pipe at the back yard. A 1.8m wide easement was considered at the northern property boundary and a 3m wide easement was included at the rear of the proposed dwellings (in accordance with Council's water Policy).
- > Additional ground terrain modifications were included to direct flows from areas displaced by the driveways towards flowpaths along the northern boundary and between the buildings to the backyard

The Ultimate Scenario model setup is presented in **Figure 3-5**, showing the extents of the building blocked in the TUFLOW model.



Figure 3-5 Ultimate Scenario Model Setup

The architectural drawings are provided in **Appendix D.** The Existing and Proposed terrain 0.1m contours are presented in **Appendix E**.

## 4 Flood Modelling Results (refer Appendix F)

Flood models were prepared for Existing, Proposed and Ultimate scenarios as described in Section 3 of this report.

Modelled results are shown in in the following figures in Appendix F.

- Figure 4-1 20% AEP Peak Depths Existing Scenario;
- Figure 4-2 20% AEP Peak Velocity Existing Scenario;
- Figure 4-3 20% AEP Provisional Hazard Existing Scenario;
- Figure 4-4 20% AEP Peak Depths Proposed Scenario;
- Figure 4-5 20% AEP Peak Velocity Proposed Scenario;
- Figure 4-6 20% AEP Provisional Hazard Proposed Scenario;
- Figure 4-7 20% AEP Peak Water Level Difference Plot Proposed Minus Existing Scenario;
- Figure 4-8 5% AEP Peak Depths Existing Scenario;
- Figure 4-9 5% AEP Peak Velocity Existing Scenario;
- Figure 4-10 5% AEP Provisional Hazard Existing Scenario;
- Figure 4-11 5% AEP Peak Depths Proposed Scenario;
- Figure 4-12 5% AEP Peak Velocity Proposed Scenario;
- Figure 4-13 5% AEP Provisional Hazard Proposed Scenario;
- Figure 4-14 5% AEP Peak Water Level Difference Plot Proposed Minus Existing Scenario;
- Figure 4-15 1% AEP Peak Depths Existing Scenario;
- Figure 4-16 1% AEP Peak Velocity Existing Scenario;
- Figure 4-17 1% AEP Provisional Hazard Existing Scenario;
- Figure 4-18 1% AEP Peak Depths Proposed Scenario;
- Figure 4-19 1% AEP Peak Velocity Proposed Scenario;
- Figure 4-20 1% AEP Provisional Hazard Proposed Scenario;
- Figure 4-21 1% AEP Peak Water Level Difference Plot Proposed Minus Existing Scenario
- Figure 4-22 1% AEP Peak Depths Revised Existing Scenario;
- Figure 4-23 1% AEP Peak Velocity Revised Existing Scenario;
- Figure 4-24 1% AEP Provisional Hazard Revised Existing Scenario;
- Figure 4-25 1% AEP Peak Depths Ultimate Scenario;
- Figure 4-26 1% AEP Peak Velocity Ultimate Scenario;
- Figure 4-27 1% AEP Provisional Hazard Ultimate Scenario;
- Figure 4-28 1% AEP Peak Water Level Difference Plot Ultimate Minus Revised Existing Scenario.

## 5 Summary of Flood Impact Assessment

## 5.1 Flood Impacts to Neighbouring Properties

#### Proposed Scenario – Subdivision and Drainage Network Diversion:

Changes to the peak water levels in the 20%, 5% and 1% AEP events for the proposed scenario compared to the existing flood conditions near the subject site are shown in **Figure 4-7**, **Figure 4-14** and **Figure 4-21**, respectively. Inspection of these figures shows that there is generally no afflux (changes in flood level) at adjacent properties for the proposed pipe diversion in all design flood events. Minor localised increases of up to 0.02m are observed on the adjacent property on the south side of the subject site. However, this impact is considered as negligible and within the tolerances of the model.

#### Ultimate Scenario - Future development of dwellings:

Changes to the peak water levels in the 1% AEP event for the Ultimate Scenario compared to the Revised Existing Scenario are shown in **Figure 4-28**. The results show the Ultimate Scenario including the drainage network diversion, new buildings and proposed terrain will have no adverse impacts on adjacent properties. Minor decreases of flood levels are observed at the adjacent property to the south. Localised increases in flood levels are observed on the footpath which is considered negligible due to the limited extents.

Hazard remains low across the site with small areas of transitional hazard. There are no areas of high hazard.

### 5.2 Drainage Network Capacity

Capacity of the drainage infrastructure for the 20%, 5% and 1% AEP events in the Proposed and Ultimate scenarios have not changed in comparison to the existing scenario. Therefore, the proposed development will not have an impact on the capacity of Council's drainage network upstream or downstream of the development site. **Table 5-1** and **Table 5-2** show the comparison of the existing and post-development peak flow in the pipe system and along overland flowpaths, respectively.

Pipe ID	5% AEP event		1% AEP event	
	Flow in Existing scenario (m³/s)	Flow in Proposed scenario (m³/s)	Flow in Existing scenario (m³/s)	Flow in Proposed scenario (m³/s)
Pipe43	0.48	0.48	0.50	0.50
Pipe33	1.11	1.11	1.14	1.14
Pipe31	0.48	-	0.50	-
Pipe44	0.48	-	0.50	-
Pipe32	0.47	0.47	0.50	0.50
Pipe01_CRN	-	0.47	-	0.50
Pipe02_CRN	-	0.47	-	0.50

Table 5-1 Flow in existing and proposed drainage network

Overland flow ID	5% AEP event		1% AEP event	
	Overland flow in Existing scenario (m³/s)	Overland flow in Proposed scenario (m³/s)	Overland flow in Existing scenario (m <sup>3</sup> /s)	Overland flow in Proposed scenario (m³/s)
OF1	1.21	1.21	1.76	1.76
OF2	0.20	0.20	0.30	0.30
OF3	0.66	0.66	0.81	0.81
OF4	0.36	0.36	0.59	0.59
OF5	0.85	0.85	1.32	1.32

Table 5-2 Overland flow in existing and proposed scenario

## 5.3 Flood Planning Levels

Based on Council's DCP clause 7.4 "New buildings or extensions involving habitable areas are to be designed to prevent the entry of stormwater for floods up to 100 year ARI and all new habitable floor levels are to have a 500mm freeboard to the 100 year ARI flood".

It is important to ensure that future dwellings constructed over the development site maintain the necessary freeboard from flood levels required by the flood planning level. **Table 5-3** below shows indicative flood planning levels at Playfair Rd and the overland flow paths along the northern boundary and through the rear yard of the site. The reference points are shown in **Figure 5-1**. Final flood planning levels will be subject to confirmation of the final built form and location of entrances to habitable areas.

Reference Point	Location	100Yr ARI (1% AEP) Peak Water Level (m AHD)	Indicative Flood Planning Level (FPL) (m AHD)
A1	Block 'A' Garage Entrance	16.32	16.82
A2	Block 'A' northern side entry	15.15	15.65
A3	Block 'A' southern side entry	15.35	15.85
A4	Block 'A' rear yard/entry	15.10	15.60
B1	Block 'B' Garage Entrance	16.32	16.82
B2	Block 'B' northern side entry	15.32	15.82
B3	Block 'B' southern side entry	N/A	N/A
B4	Block 'B' rear yard/entry	16.00	16.00

 Table 5-3
 Peak Water Level and Flood Planning Level (FPL) for Proposed Future Dwellings



Figure 5-1 Flood level reference points

## 5.4 Flood compatible building materials and structural engineering

The future dwellings are proposed to have suspended pier/pile footings which will allow water to flow through under the building. The sides would be clad in a louvered screens with compliant openings. All materials used for areas below the flood planning level shall be Flood Compatible Building Materials including concrete and non-corrosive metal and avoid soft timber or fibreboard.

A structural engineering assessment has been carried out and reported separately.

## 5.5 Compliance with Council DCP

The following table documents the checklist of compliance against relevant DCP clauses for both the subdivision DA and the future dwellings.

			Compliance	
		Not Applicable	Yes	No
А	Flood effects caused by Development		Х	
В	Drainage Infrastructure & Creek Works		Х	
С	Building Components & Structural		X*	
D	Storage of Goods	X*		
Е	Flood Emergency Response		X*	
F	Floor Levels		X*	
G	Car Parking		X*	
Н	Fencing		X*	
Ι	Pools	X*		

\* Not the subject of this subdivision DA

## 6 Conclusion

Flood modelling has been undertaken for existing and proposed scenarios for the development of 17 Playfair Road, North Curl Curl. Modelling has been undertaken using DRAINS software for the hydrological assessment and a TUFLOW model for the hydraulic assessment. Appropriate pit inlet blockage and pit loss parameters have been applied to the model.

The modelling shows the site and neighbouring properties are currently affected by overland flows from the 20% up to the 1% AEP flood event.

The proposed scenario model results show:

- > There are generally no changes to flood levels adjacent to No 17 Playfair Rd for the proposed pipe diversion in all design flood events;
- Minor localised increases to the peak water level occur in a 1% AEP on the adjacent property to the south side of the subject site with maximum water level increase of 0.02m. This impact is considered acceptable and within model tolerances;
- > There are no increases in flood hazard to surrounding areas as a result of the proposal and minor decreases to areas of high provisional hazard are observed in a 1% AEP event within the subject site;
- > There is no change in flows and no reduction in the capacity of Council's stormwater network upstream or downstream of the development site.

The Ultimate Scenario model results show:

- > The proposed future dwellings will have no impacts on flood levels at adjacent properties;
- > Minor decreases in flood levels are observed at the adjacent property to the south;
- The distribution of hazard areas has changed due to the changes in the landform and new dwellings which have altered flowpaths. However, hazard on the site generally remains as 'low' hazard with small areas of 'transitional' hazard along flow paths

## 6.1 Standard Hydraulic Certification (Form A/A1)

Northern Beaches Council Standard Hydraulic Certification Form A/A1 is provided on the next page.

## 6.2 Author's Qualifications

Both the author and approver of this Flood Impact Assessment have relevant tertiary qualifications and are members or are eligible for membership of Engineers Australia.

## Attachment A

## NORTHERN BEACHES COUNCIL STANDARD HYDRAULIC CERTIFICATION FORM

FORM A/A1 – To be submitted with Development Application

**Development Application for** 

Address of site: <u>17 Playfair Rd, North Curl Curl</u>

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, David Whyte	on behalf of Cardno (NSW/ACT) Pty Ltd
(Insert Name)	(Trading or Business/ Company Name)
on this the 27 November 2018	certify that I am engineer or a

(Date)

professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least \$2 million.

Flood Management Report Details:
Report Title:
Flood Impact Assessment, 17 Playfair Rd North Curl Curl
Report Date:27 November 2018
Author:Venus Jofreh
Author's Company/Organisation:Cardno (NSW/ACT) Pty Ltd

I: David Whyte (Insert Name)

Please tick all that are applicable (more than one box can be ticked)

- ☑ have obtained and included flood information from Council (must be less than 12 months old) (This is mandatory)
- ☑ have followed Council's Guidelines for Preparing a Flood Management Report
- □ have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Dane	
Signature	
NameDavid Whyte	

## 17 Playfair Road, North Curl Curl

## APPENDIX



## NORTHERN BEACHES COUNCIL PRE-LODGEMENT MEETING NOTES



## NORTHERN BEACHES COUNCIL

northernbeaches.nsw.gov.au

Application No:	SPLM2016/0001
Meeting Date:	02/09/2016
Property Address:	17 Playfair Road NORTH CURL CURL NSW 2099
Proposal:	
Attendees for Council:	Sean Khoo – Specialist Development/Drainage Engineer Dean McNatty – Stormwater Assets Engineer
Attendees for applicant:	Jane Alexander Simson Bruce Kenny

#### **General Comments:**

You are advised to carefully read these notes. If there is an area of concern or non-compliance, you are strongly advised to review and reconsider the appropriateness of the design of your development for your site prior to the lodgement of any development application.

Civic Centre, 725 Pittwater Road Dee Why NSW 2099 ABN 57 284 295 198 t. 02 9942 2111 f. 02 9971 4522 Village Park, 1 Park Street Mona Vale NSW 2103 ABN 57 284 295 198 t. 02 9970 1111 f. 02 9970 1200

#### **Stormwater Pre-Lodgement Meeting Notes**

I refer to the proposed concept stormwater drainage proposal as shown in the site plan project no. GO150923 prepared by ACOR consultants , dated 16 August 2016.

The pre-lodgement comments below relate only to the proposed decommissioning and removal of the stormwater drainage traversing the properties at 15 and 17 Playfair Road. These comments are preliminary in nature and a detailed assessment can only be undertaken upon lodgement of a Development Application. Any comments for the subdivision of 17 Playfair Road are to be provided under a separate pre-lodgement application.

I wish to confirm the following advice given for stormwater drainage requirements from the site only as discussed at the pre-lodgement meeting today:

- 1. Based on the information provided Council cannot support the decommissioning and removal of Council's 675mm diameter pipeline within 15 and 17 Playfair Road, as this will result in the reduction in the capability of the public stormwater drainage system located within Playfair Road and within 17 Playfair Road and potentially exacerbate localised flooding in the catchment.
- 2. However Council may accept the decommissioning and removal of the above pipeline provided the following can be demonstrated to Council's satisfaction:
  - Capacity of the remaining piped drainage infrastructure for the whole (both upstream and downstream) catchment is not reduced for all storms up to and including the 1 in 100 yr ARI storm
  - Surface stormwater hazards (velocity, depth, depth x velocity product, etc) within the public roadway and private properties (upstream and downstream of 17 Playfair Road) are not exacerbated for all storms up to and including the 1 in 100 yr ARI storm
  - As it is considered cost prohibitive for the applicant to upgrade Council's stormwater drainage infrastructure between 17 Playfair Road and the lagoon, Council may consider stormwater drainage pipeline diversion within 17 Playfair Road to address the above matters and ensure the underground stormwater drainage system has the 1 in 20 year ARI capacity which must be clearly shown on the drawings
- 3. In this regard, a flood study must be prepared for the existing and proposed scenario using DRAINS for the hydrological assessment and TUFLOW for the hydraulics assessment. This study must consider the whole catchment both upstream and downstream of 17 Playfair Road, and down to the receiving water in the Curl Curl Lagoon.
- 4. Sufficient cross sections are to be provided in the report to demonstrate flood waters in Playfair Road and adjoining roads downstream are not exacerbated. Cross sections to be analysed and provided where the existing finished ground surface levels of properties adjoining Playfair Road are lower than the adjoining top of kerb levels in Playfair Road.

- 5. Appropriate inlet blockage and pit loss factors adopted in the study are to be consistent with Australian Rainfall and Runoff, 1987, Council's AUS SPEC #1 and Water Management Policy.
- 6. Supporting calculations/details to justify the pit loss factors adopted in the DRAINS computer model for Council's pits SPP07371 and SPP07375.

For additional information in relation to the stormwater pre-lodgement notes please contact Sean Khoo , Development Engineer at Northern Beaches Council on 9942 2111 during business hours Monday to Friday.

## Roberts, Anthony

From:	Roberts, Anthony
Sent:	Tuesday, 18 September 2018 3:01 PM
To:	'Rodney Piggott'
Cc:	Dean McNatty; Sean Khoo; 'Greg Boston'; 'Tim Michel'; 'Pos Simson'
Subject:	RE: [EXT]:FW: PLM2018/0094 - 17 Playfair Road, North Curl Curl

Rod,

Thanks for the engineering comments received today and most helpful in concluding our DA submission.

Was there any Council review / comment on the proposed dwelling architectural documentation? Please confirm the Architectural submission provided was sufficient to support a 2 lot subdivision application and responds appropriately to Council's previous request.

Kind Regards

Anthony Roberts

M +61 409 821 998

From: Rodney Piggott [mailto:Rodney.Piggott@northernbeaches.nsw.gov.au] Sent: Tuesday, 18 September 2018 2:35 PM To: Roberts, Anthony <Anthony.Roberts@lendlease.com> Cc: Dean McNatty <Dean.McNatty@northernbeaches.nsw.gov.au>; Sean Khoo <Sean.Khoo@northernbeaches.nsw.gov.au> Subject: [EXT]:FW: PLM2018/0094 - 17 Playfair Road, North Curl Curl

Dear Anthony,

Please find updated comments as discussed.

"1. Please find below comments relating to our discussions today with the applicant. Any Development Application would need to consider the following:

- Filling is proposed over Council's pipeline along the proposed new alignment. A contour plan is required to show existing contours and proposed contours to achieve a Min 300mm cover over the pipe collar at the shallowest location.
- It is recommended that overland flows are directed around the proposed future dwelling locations to mitigate impacts on these dwellings. The proposal is to demonstrate the new overland flow path regime with the proposed filling throughout the site, building footprints and neighbouring properties.
- Any long sections of the proposed pipeline should show proposed and existing ground levels.
- Cross section BB 'Block A' shows the proposed pipeline running directly along under the boundary alignment. This is not supported.
- Easement width Council will consider an easement width of 1.8m wide along the northern boundary of the site (due to proposed widths of new lots) with a 3.0m wide easement across the rear of the proposed dwellings in accordance with Council's Water Policy.

2. Stormwater drainage pipeline calculations and flood report to be submitted with any Development Application:

• Surface stormwater hazards (velocity, depth, depth x velocity product, etc) within the public roadway and private properties (upstream and downstream of 17 Playfair Road) are not exacerbated for all storms up to and including the 1 in 100 yr ARI storm. This includes difference mappings of the above hazards.

• As it is considered cost prohibitive for the applicant to upgrade Council's stormwater drainage infrastructure between 17 Playfair Road and the lagoon, Council may consider stormwater drainage pipeline

diversion within 17 Playfair Road to address the above matters and ensure the underground stormwater drainage system has the 1 in 20 year ARI capacity which must be clearly shown on the drawings

3. A flood study must be prepared for the existing and proposed scenario using DRAINS for the hydrological assessment and TUFLOW for the hydraulics assessment. This study must consider the whole catchment both upstream and downstream of 17 Playfair Road, and down to the receiving water in the Curl Curl Lagoon. DRAINS computer model used in the flood study is to be submitted with the Development Application.

4. Sufficient cross sections are to be provided in the report to demonstrate flood waters in Playfair Road and adjoining roads downstream are not exacerbated. Cross sections to be analysed and provided where the existing finished ground surface levels of properties adjoining Playfair Road are lower than the adjoining top of kerb levels in Playfair Road.

5. Appropriate inlet blockage and pit loss factors adopted in the study are to be consistent with Australian Rainfall and Runoff, 1987, Council's AUS SPEC #1 and Water Management Policy.

6. Supporting calculations/details to justify the pit loss factors adopted in the DRAINS computer model for Council's pits SPP07371 and SPP07375."

Regards **Rodney Piggott** Manager Development Assessments

Development Assessment Manly/Dee Why t 02 9942 2489 m 0419 998 150 rodney.piggott@northernbeaches.nsw.gov.au northernbeaches.nsw.gov.au



northern beaches council

#### Northern Beaches Council

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## PRELODGEMENT ADVICE

Application No:	PLM2018/0094
Meeting Date:	24 May 2018 and 4 September 2018
Property Address:	17 Playfair Road, North Curl Curl
Proposal:	Demolition of existing improvements and Subdivision of one lot into two lots
Attendees for Council:	Adam Mitchell – Principal Planner Dean McNatty – A/Manager Stormwater and Floodplain Engineering Rod Piggott – Manager Development Assessment Sean Khoo – Specialist Development / Drainage Engineer
Attendees for applicant:	Anthony Roberts – Client Greg Boston - Planner Pos Simson – Client Tim Michel - Cardno

#### Introduction

This prelodgement meeting is to discuss a proposal for demolition works and the subdivision of No. 17 Playfair Road, North Curl Curl from one allotment into two allotments.

A initial meeting was held on 24 May 2018 to discuss the proposal, however one of Council's referral bodies was unable to attend the meeting. Accordingly, a secondary meeting was held on 4 September 2018.

The secondary meeting held was to discuss matters pertaining to stormwater only – not planning matters.

Herein these non-verbatim minutes will address the development without differentiating the content of each of the two meetings.

Dee Why Office: 725 Pittwater Road Dee Why NSW 2099 DX 9118 Dee Why f 02 9971 4522 Mona Vale Office: 1 Park Street Mona Vale NSW 2103 DX 9018 Mona Vale f 02 9970 1200



## WARRINGAH LOCAL ENVIRONMENTAL PLAN 2011 (WLEP 2011)

Zoning and Permissibility		
Definition of proposed development:	Subdivision of land	
Zone:	R2 Low Density Residential	
Permitted with Consent or Prohibited:	Permitted with consent	

Principal Development Standards		
4.1 Minimum subdivision	Requirement: 450 square metres per lot	
lot size	Proposed: Lot 1 and Lot 2 – 458.6 square metres	

#### Comment

The draft subdivision plan demonstrates that the site is capable of being subdivided in a manner that provides two allotments that comply with the requisite minimum subdivision lot size.

### WARRINGAH DEVELOPMENT CONTROL PLAN 2011 (WDCP 2011)

Specific DCP Clauses for discussion				
Built Form Controls	This application is for subdivision only, and thereby it is not necessary to undertake a detailed built form analysis. The documentation provided adequately demonstrates that the allotments are capable of accommodating complying dwellings.			
	Note: given the constraints of the allotment (as discussed in detail in the referral section of this report), Council may consider some variation to setback controls where it can be demonstrated that:			
	<ul> <li>(a) It is the only feasible way to develop the land and provide an easement</li> <li>(b) The variations do not cause adverse amenity impacts upon occupants of the development or surrounding developments</li> <li>(c) The building maintains 'low density' appearance when viewed from the public domain.</li> </ul>			
	Such dispensations will be a matter for consideration in development applications for the construction of a dwelling house.			



Specialist Advice	
Development Engineer	
Drainage Asset	<ul> <li>Filling is proposed over Council's pipeline along the proposed new alignment. A contour plan is required to show existing contours and proposed contours to achieve a Min 300mm cover over the pipe collar at the shallowest location.</li> <li>It is recommended that overland flows are directed around the proposed future dwelling locations to mitigate impacts on these dwellings. The proposal is to demonstrate the new overland flow path regime with the proposed filling throughout the site, building footprints and neighbouring properties.</li> <li>Any long sections of the proposed pipeline should show proposed and existing ground levels.</li> <li>Cross section BB 'Block A' shows the proposed pipeline running directly along under the boundary alignment. This is not supported.</li> <li>Easement width – Council will consider an easement width of 1.8m wide along the northern boundary of the site (due to proposed widths of new lots) with a 3.0m wide easement across the rear of the proposed dwellings in accordance with Council's Water Policy.</li> </ul>

### **Relevant Council Policies**

You are advised of the following (but not limited to all) Council's policies available at Council's website:

- DA Management Policy
- Stormwater drainage for low level properties PDS-POL 135
- Vehicle access to all roadside development: LAP-PL 315
- Waste PL 850

#### Documentation to accompany the Development Application

- Electronic copies (USB)
- Statement of Environmental Effects
- Cost of works estimate/ Quote
- Site Plan
- A4 Notification Plans
- Survey Plan
- Site Analysis Plan
- Demolition Plan
- Waste Management Plan (Construction & Demolition)



- Subdivision Plan
- Erosion and Sediment Control Plan / Soil and Water Management Plan
- Stormwater Management Plan / Stormwater Plans and On-site Stormwater Detention (OSD)
   Checklist
- Stormwater Drainage Assets Plan
- Flood Risk Assessment Report
- Overland Flows Study

Please refer to Development Application Checklist for further detail.



## PRELODGEMENT ADVICE

#### **Concluding Comments**

The proposal for demolition works and the subdivision of one allotment into two allotments is considered to be acceptable for the land.

No fundamental planning concerns are raised and it has been reasonably demonstrated that the land can comfortably accommodate to appropriately scaled detached dwelling houses.

Given the stormwater constraints upon the land, variation can be considered to the side boundary setback control of the WDCP 2011 subject to the criteria earlier in these notes. It is strongly recommended that on-going and continual liaison with Council's Engineers progresses to a satisfactory point prior to the lodgement of the development application.

Questions regarding the content of these notes may be directed to:

#### Adam Mitchell – Principal Planner

E: Council@northernbeaches.nsw.gov.au

T: 1300 434 434

#### **General Comments/Limitations of these Notes**

These notes have been prepared by Council on the basis of information provided by the applicant and a consultation meeting with Council staff. Council provides this service for guidance purposes only. These notes are an account of the specific issues discussed and conclusions reached at the pre-lodgement meeting. These notes are not a complete set of planning and related comments for the proposed development. Matters discussed and comments offered by Council will in no way fetter Council's discretion as the Consent Authority. A determination can only be made following the lodgement and full assessment of the development application.

In addition to the comments made within these notes, it is a requirement of the applicant to address ALL relevant pieces of legislation including (but not limited to) any SEPP and any applicable clauses of the Warringah LEP 2011, Warringah LEP 2000 and Warringah DCP 2011 within the supporting documentation of a development application including the Statement of Environmental Effects.

You are advised to carefully review these notes. If there is an area of concern or noncompliance that cannot be supported by Council, you are strongly advised to review and reconsider the appropriateness of the design of your development for your site and the adverse impacts that may arise as a result of your development prior to the lodgement of any development application.

Dee Why Office: 725 Pittwater Road Dee Why NSW 2099 DX 9118 Dee Why f 02 9971 4522 Mona Vale Office: 1 Park Street Mona Vale NSW 2103 DX 9018 Mona Vale f 02 9970 1200

## 17 Playfair Road, North Curl Curl

# 



# SURVEY AND PLAN OF SUBDIVISION







						COPYRIGHT ©		
CLIENT	ΡΠΟΙΕΟΤ	TITLE	ΝΕΟΠΜΑΤΙΟΝ	QUALITY ASSURAN	CE	THIS DOCUMENT IN BOTH ELECTRONIC AND HARDCOPY IS CONFIDENTIAL AND REMAINS THE PROPERTY OF VERIS	Date of Survey: 11/01/16	Date of Plan: <b>30/11/17</b>
MRS P. SIMSON	17 PLAYFAIR ROAD,	Lot:	LOT 24	Surveyor: BJ		IT MUST NOT BE REPRODUCED BY ANY PERSON(S) OR USED FOR ANY OTHER PROJECT WITHOUT THE WRITTEN	Datum: AHD	Co-ords:
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3	18.29	17.09		
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5	17.30	16.40		
6	17.30	16.30		



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## 17 Playfair Road, North Curl Curl

# APPENDIX



## **CIVIL DESIGN DRAWINGS**









LOCALITY PLAN N.T.S



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2	13.12.2018	ISSUE FOR DEVELOPMENT APPLICATION	ТМ	HT	TM
1	03.12.2018	ISSUE FOR DEVELOPMENT APPLICATION	ΤМ	HT	TM
Rev.	Date	Description	Des.	Verif.	Appd.

# MRS. P SIMSON **17 PLAYFAIR ROAD** NORTH CURL CURL **STORMWATER DRAINAGE WORKS DEVELOPMENT APPLICATION**

# DEVELOPMENT SITE

SCHEDULE OF DRAWINGS						
DRAWING No.	DESCRIPTION					
59918041-DA-000	TITLESHEET, LOCALITY PLAN AND GENERAL NOTES					
59918041-DA-001	STORMWATER PLAN					
59918041-DA-002	SITEWORKS PLAN					
59918041-DA-003	EROSION AND SEDIMENT CONTROL PLAN AND DETAILS					
59918041-DA-010	STORMWATER LONGITUDINAL SECTION AND DETAILS					

## SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY VERIS (FORMERLY LAWRENCE GROUP), BEING REGISTERED SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. CARDNO DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT THE SUPERINTENDENT.

## EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION, SURE SEARCH UNDERGROUND SERVICES REPORT (11/01/16) AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED TO SHOW THE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE. CARDNO CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS, CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

## PROPOSED WORKS LEGEND EXISTING (REFER SURVEY NOTES)

PROPOSED • F14.52

FINISHED SURFACE LEVEL SITE BOUNDARY STORMWATER PIT & LINE. REFER LONGITUDINAL SECTION.

## EROSION AND SEDIMENT CONTROL NOTES

1. ORIGIN OF LEVELS: REFER SURVEY NOTES 2. STRIP TOPSOIL/ORGANIC MATERIAL FROM CONSTRUCTION AREA AND REMOVE FROM SITE. 3. EXCAVATED MATERIAL TO BE REMOVED FROM SITE 4. COMPACT FILL AREAS AND SUBGRADE TO NOT LESS THAN: LOCATION STANDARD DRY DENSITY (AS 1289 5.1.1.) UNDER BUILDING SLABS ON GROUND LANDSCAPED AREAS UNLESS NOTED OTHERWISE 95% 5. FOR NON COHESIVE MATERIAL, COMPACT TO 70% DENSITY INDEX . THE EXPOSED SURFACE SHOULD BE COMPACTED WITH A MINIMUM 0F 8 PASSES OF A 10 TONNE (MINIMUM DEAD WEIGHT) ROLLER, FOLLOWED BE TEST ROLLING IN THE PRESENCE OF A CONSTRUCTION", 4th EDITION, MARCH 2004. GEOTECNICAL ENGINEER AND RECTIFIED AS REQUIRED. WHERE SOFT SPOTS ARE IDENTIFIED, THEY SHOULD BE EXCAVATED AND THEN BACKFILLED USING SUITABLE GRANULAR MATERIAL AND COMPACTED IN 0.25m (LOOSE THICKNESS) LAYERS. IF SOFT MATERIALS EXCEED 0.5m, A BRIDGING LAYER MAY BE REQUIRED. FREQUENCY OF COMPACTION TESTING SHALL BE NOT LESS THAN :-(A) 1 TEST PER 200m<sup>3</sup> OF FILL PLACED PER 250 LAYER OF FILL. (B) 3 TESTS PER VISIT (C) 1 TEST PER 1000m<sup>2</sup> OF EXPOSED SUBGRADE TESTING SHALL BE "LEVEL 1" TESTING IN ACCORDANCE WITH AS 3798 (2007)8. FILLING TO BE PLACED IN MAXIMUM 250mm – LOOSE LAYERS AND COMPACTED AS SPECIFIED 9. NO FILLING SHALL TAKE PLACE TO EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED IN THE PRESENCE OF CERTIFYING AUTHORITY AND ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THA THE GEOTECHNICAL ENGINEER AND APPROVAL GIVEN IN WRITING THAT FILLING CAN PROCEED. STORMWATER DRAINAGE NOTES PIPES TO BE REINFORCED CONCRETE CLASS '4' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O. PIPES WITH SOCKETS SHALL BE LAID IN BEDDING WHERE SUITABLE RECESSES HAVE BEEN PROVIDED TO ENSURE PIPES DO NOT BEAR ON THEIR SOCKETS. PIPES TO BE INSTALLED TO TYPE HS2 SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 250mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75). ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2018) AND AS/NZS 3500 3.2 (2018). CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL. . GRATES AND COVERS SHALL CONFORM TO AS 3996. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS. ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

SHOWN ON THE DRAWINGS SHALL ONLY BE USED AS A GUIDE BY THE MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED OR AS OTHERWISE DIRECTED BY THE SUPERINTENDENT. a. LOCAL AUTHORITY REQUIREMENTS PLAN. REFER DETAIL. LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

1. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONTROL OF EROSION AND SEDIMENTATION TO THE SATISFACTION OF COUNCIL. OFFICE OF WATER. SYDNEY WATER AND OFFICE OF ENVIRONMENT AND HERITAGE. TO THIS END, THE EROSION AND SEDIMENTATION CONTROLS CONTRACTOR, AND SHALL REPRESENT THE MINIMUM REQUIREMENT ONLY 2. THE CONTRACTOR SHALL ENSURE THAT ALL SOIL AND WATER b. NSW OFFICE OF ENVIRONMENT & HERITAGE REQUIREMENTS c. NSW GOVERNMENT "MANAGING URBAN STORMWATER, SOILS AND OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.

4. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION

THE SURFACE) WILL BE REMOVED AS SOON AS FEASIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.

10. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.

REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

13. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY: a.PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE

**b.ENSURING THAT NOTHING IS NAILED TO THEM** c.PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF

(I) ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER

GENERAL INSTRUCTIONS 3. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH 5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS. LAND DISTURBANCE 6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE: a.INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON **b.INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.** c.UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE **EROSION CONTROL** 7. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. 8. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES. SEDIMENT CONTROL 9. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE 11. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE OTHER MATTERS 12. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER. STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS. (II) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH (III) CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

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## BULK EARTHWORKS NOTES

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F's: X-TITLE SHEET; X-Survey\_m; XR-59918041-CC-Stormwater Drainage; XR-59918041-CC-Sediment erosion control plan File: N-IProiects/590/FY18/041\_FA\_17\_Plavfair\_North\_Curt/Drawinos/Build/Drawinos/DA(59918041-DA-003\_FROSION & SFDIMENT



DATE PLOTTED: 13 December 2018 5:57 PM BY : DAMIEN I

EF's: X-TITLE SHEET; Surface\_Inlet\_Pit\_1200; Detail\_E; X LS SWD; Kerb\_Only; SECTION A; SECTION B; A2; Step\_Iron; PITSCHED D File: N:\Projects\599\FY18\041\_FA 17 Playfair North Curl Curl\Drawings\Build\Drawings\DA\59918041-DA-010 STORMWATER LONGITUDINAL SECTION AND DETAILS

COVER (WITH SUITABLE LIFTING HOLES) OR GRATE & FRAME AS SPECIFIED. IN PIT SCHEDULE NIW 052 (d/L) 3N12 NIW 052 (d/L) 30 FALL	PE AREAS REFER DETAIL 'A' L 82 FABRIC 0 TOP COVER N12 - 300 BOTH WAYS (CENTRAL). EXISTING RL IN 19 PLAYFAIR RD O O O O O O O O O O O O O	DDING	PROPOSED RL IN 17 PLAYFAIR RD
200 1150 200	COVER OR G FRAME AS S REFER PIT S	SPECIFIED 70 SPECIFIED MIN.	
	TASS CONCRETE		5% AEP FLOW (m³/s)
SECTION 2 B SCALE 1:20 -	ENCHING RECESS T COVER OF	TO SUIT R FRAME DETAIL 'A' SCALE 1:10	VELOCITY (m/s)
	ROVIDE STEP IRONS		PIPE SIZE & CLASS
FLOW			GRADE (%)
	ਤ <u>FRONT ELEVA</u>	TION SIDE ELEVATION	H.G.L. LEVEL
		20 DIA. GALVANISED MILD STEEL	PROPOSED INVERT LEVEL PROPOSED SURFACE LEVEL EXISTING SURFACE LEVEL CHAINAGE
PLAN SCALE 1:20	<u></u> <u>ST</u>	EP IRON DETAIL	
<u>PIT A2</u>		NTS	
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#### ARCHITECTURAL DRAWINGS



## SUBMISSION FOR DEVELOPMENT APPLICATION

No. 17 PLAYFAIR Road, North Curl Curl, for Mrs. SIMSON

#### CONTENTS OF SUBMISSION

- DA\_00 COVER SHEET & LOCATION PLAN
- DA\_01 SITE PLAN
- DA\_02 GROUND FLOOR & FIRST FLOOR PLAN BLOCK 'A'
- DA\_03 NORTH ELEVATION & ROOF PLAN BLOCK 'A'
- DA\_04 SECTIONS & DETAIL BLOCK 'A'
- DA\_05 FRONT ELEVATION & PERSPECTIVE VIEW BLOCK 'A'
- DA\_06 SOLAR DIAGRAM BLOCK 'A'
- DA\_07 GROUND FLOOR & FIRST FLOOR PLAN BLOCK 'B'
- DA\_10 DEMOLITION PLAN'



геу.	date	details
Α	July 2018	DEVELOPMENT APPLICATION ISSUE
B	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Drawing No. 10 'DEMOLITION PLAN' added



PROPOSED NEW RESIDENTIAL
DEVELOPMENT
at

No. 17 Playfair Road/ North Curl Curl for Mrs. P. Simson title sheet: COVER SHEET

date: drawn: sheet No.: revision:

December 2018 Milan Busina. 00 B





A	JULY ZV 10	DEVELOPMENT APLICATION ISSUE
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Ground Floor & 1St. Floor levels revised



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гev.	date	details		
А	July 2018	DEVELOPMENT APLICATION ISSUE		
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE		
		Ground Floor & 1St. Floor levels revised		





геч.	date	details
А	July 2018	DEVELOPMENT APLICATION ISSUE
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Ground Floor & 1St. Floor levels revised



DET. XX' INDICATIVE CROSS SECTION THROUGH STORMWATER EASEMENT/ INDICATIVE SUSPENDED DECKING DETAIL SCALE 1:20

PROPOSED NEW RESIDENTIAL DEVELOPMENT	title sheet:	SECTIONS DETAIL
aı	date:	December 2018
No. 17 Playfair Road/ North Curl Curl	drawn:	Milan Busina.
for	sheet No.:	04
Mrs. P. Simson	revision:	B



геу.	date	details
Α	July 2018	DEVELOPMENT APLICATION ISSUE
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Ground Floor & 1St. Floor levels revised

PROPOSED NEW RESIDENTIAL DEVELOPMENT	title sheet:	FRONT ELEVATION PERPECTIVE VIEW
No. 17 Playfair Road/ North Curl Curl for Mrs. P. Simson	date: drawn: sheet No.: revision:	December 2018 Milan Busina. 05 B



геу.	date	details
А	July 2018	DEVELOPMENT APLICATION ISSUE
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Ground Floor & 1St. Floor levels revised



 PROPOSED NEW RESIDENTIAL DEVELOPMENT	title
at No. 17 Playfair Road/ North Curl Curl	date:
for Mrs. P. Simson	shee revis

e sheet: SOLAR DIAGRAM

date: December 2018 drawn: Milan Busina. sheet No.: 06 revision: B





геу.	date	details
Α	July 2018	DEVELOPMENT APLICATION ISSUE
В	Dec. 2018	DEVELOPMENT APPLICATION ISSUE
		Ground Floor & 1St. Floor levels revised

GROUND FLOOR PLAN BLOCK 'B' SCALE 1:100 (SCALED IN A2 SHEET)

FIRST FLOOR PLAN BLOCK 'B' SCALE 1:100 (SCALED IN A2 SHEET)



PROPOSED NEW RESIDENTIAL DEVELOPMENT	title sheet:	FLOOR PLANS
at	date:	December 2018
No. 17 Playfair Road/ North Curl Curl	drawn:	Milan Busina.
for	sheet No.:	07
Mrs. P. Simson	revision:	B

## APPENDIX



#### **EXISTING AND DESIGN CONTOURS**







## APPENDIX

#### FLOOD MODEL RESULTS FIGURES





Figure 4-1

Depth and Water Level Contours

20% AEP Event

**Exisiting Case** 

PEAK	K DEPTH (m)
	0.02-0.05m
	0.05-0.15m
	0.15-0.30m
	0.30-0.50m
	0.50-1.00m
	> 1.00m

Study Site Exisiting Buildings 0.5m Water Level Contours





Figure 4-2

Flood Velocity

20% AEP Event

**Exisiting Case** 

LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2 00

Study Site Exisiting Buildings





Figure 4-3

**Provisional Hazard** 

20% AEP Event

**Existing Case** 

LEGEND **PROVISIONAL HAZARD** 



High

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**Fransitional Zone** 

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Study Site Exisiting Buildings





Figure 4-4

Depth and Water Level Contours

20% AEP Event

**Proposed Case** 

#### PEAK DEPTH (m)

0.02-0.05m
0.05-0.15m
0.15-0.30m
0.30-0.50m
0.50-1.00m
> 1.00m

Study Site Exisiting Buildings 0.5m Water Level Contours





Figure 4-5

Flood Velocity

20% AEP Event

**Proposed Case** 

LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2 00

Study Site Exisiting Buildings





Figure 4-6

**Provisional Hazard** 

20% AEP Event

**Proposed Case** 

LEGEND **PROVISIONAL HAZARD** 



High

	I

**Transitional Zone** 

Low

Study Site **Exisiting Buildings** 





Figure 4-7

#### Water Level Difference

#### 20% AEP Event

#### Proposed Case Less Existing

Peak Water Level Difference Centimetres



Study Site Exisiting Buildings





Figure 4-8

Depth and Water Level Contours

**5% AEP Event** 

**Exisiting Case** 

PEAK DEPTH (m)

0.02-0.05m
0.05-0.15m
0.15-0.30m
0.30-0.50m
0.50-1.00m
> 1.00m

Study Site Exisiting Buildings 0.5m Water Level Contours





Figure 4-9

Flood Velocity

5% AEP Event

**Exisiting Case** 

LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2.00

Study Site Exisiting Buildings





Figure 4-10

**Provisional Hazard** 

5% AEP Event

**Existing Case** 

LEGEND **PROVISIONAL HAZARD** 



High

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L

**Fransitional Zone** 

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Study Site Exisiting Buildings





Figure 4-11

Depth and Water Level Contours

5% AEP Event

**Proposed Case** 

PEAK DEPTH (m)

0.02-0.05m
0.05-0.15m
0.15-0.30m
0.30-0.50m
0.50-1.00m
> 1.00m

Study Site Exisiting Buildings 0.5m Water Level Contours





Figure 4-12

Flood Velocity

5% AEP Event

**Proposed Case** 

LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2 00

Study Site Exisiting Buildings





Figure 4-13

**Provisional Hazard** 

5% AEP Event

**Proposed Case** 

LEGEND **PROVISIONAL HAZARD** 



High

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L

Transitional Zone

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Study Site **Exisiting Buildings** 





#### Figure 4-14

### Water Level Difference

#### 5% AEP Event

#### Proposed Case Less Existing

Peak Water Level Difference Centimetres



Study Site Exisiting Buildings





Figure 4-15

Depth and Water Level Contours

**1% AEP Event** 

**Exisiting Case** 

PEAK DEPTH (m)

- 0.02-0.05m 0.05-0.15m 0.15-0.30m 0.30-0.50m 0.50-1.00m
  - > 1.00m

Study Site Exisiting Buildings -0.5m Water Level Contours





Figure 4-16

Flood Velocity

1% AEP Event

**Exisiting Case** 

LEGEND VELOCITIES (m/s)

	0.00-0.19
	0.20-0.49
	0.50-0.99
	1.00-1.99
1	> 2 00

Study Site Exisiting Buildings




Figure 4-17

**Provisional Hazard** 

1% AEP Event

**Existing Case** 

LEGEND **PROVISIONAL HAZARD** 



High

•
1

**Transitional Zone** 

Low

Study Site Exisiting Buildings





Figure 4-18

Depth and Water Level Contours

1% AEP Event

Proposed Case

PEAK DEPTH (m)

0.02-0.05m
0.05-0.15m
0.15-0.30m
0.30-0.50m
0.50-1.00m
> 1.00m

Study Site Exisiting Buildings 0.5m Water Level Contours





Figure 4-19

Flood Velocity

1% AEP Event

**Proposed Case** 

LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2 00

Study Site Exisiting Buildings





Figure 4-20

**Provisional Hazard** 

1% AEP Event

**Proposed Case** 

LEGEND **PROVISIONAL HAZARD** 



High

**Transitional Zone** 

Low

Study Site **Exisiting Buildings** 





Figure 4-21

#### Water Level Difference

#### **1% AEP Event**

#### Proposed Case Less Existing

Peak Water Level Difference Centimetres









Figure 4-22

Depth and Water Level Contours

#### 1% AEP Event

Updated Existing Case

PEA	K DEPTH (m)
	0.02-0.05m
	0.05-0.15m
	0.15-0.30m
	0.30-0.50m
	0.50-1.00m
	> 1.00m

Fences
Study Site
Exisiting Buildings
0.5m Water Level Contours





Figure 4-23

**Flood Velocity** 

1% AEP Event

Updated Existing Case



0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2.00

Study Site Exisiting Buildings Fences





Figure 4-24

**Provisional Hazard** 

1% AEP Event

**Updated Existing** Case

LEGEND **PROVISIONAL HAZARD** 



High

1
L

Transitional Zone

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Figure 4-25

Depth and Water Level Contours

1% AEP Event

**Ultimate Case** 

PEA	K DEPTH (m)
	0.02-0.05m
	0.05-0.15m
	0.15-0.30m
	0.30-0.50m
	0.50-1.00m
	> 1.00m

Raised Buildings
 Study Site
 Exisiting Buildings
 0.5m Water Level Contours
 Fences





Figure 4-26

**Flood Velocity** 

1% AEP Event

**Ultimate Case** 

#### LEGEND VELOCITIES (m/s)

0.00-0.19
0.20-0.49
0.50-0.99
1.00-1.99
> 2.00

Raised Buildings
Study Site
Exisiting Buildings
Fences





Figure 4-27

#### **Provisional Hazard**

1% AEP Event

**Ultimate Case** 

#### LEGEND **PROVISIONAL HAZARD**



High

**Transitional Zone** 

L		0	1	N
	l	L	Lo	Lov

Raised Buildings Study Site **Exisiting Buildings** Fences





#### Figure 4-28

#### Water Level Difference

#### 1% AEP Event

# **Ultimate Case Less** Updated Existing Case Peak Water Level Difference



Was Wet, Now Dry
Was Dry, Now Wet
Raised Buildings
Study Site
Exisiting Buildings

Fences

