

APPENDIX

A

CONSULTATION MATERIALS

Alexandra Canal Flood Management Plan

Managing flood risk in your neighbourhood



Project updates

What we heard about your experiences of flooding?



1 June 2023

Between 7 March and 6 April 2023 we sought your feedback on the Alexandra Canal Flood Risk Management Study and Plan. The purpose of the engagement was to understand resident experiences of stormwater and flooding within the Alexandra Canal catchments and to identify preferences for flood management options.

Key points on the engagement methods and results:

- The Your Say Inner West project page was viewed 650 times
- Five people shared their experiences of flooding via the online survey and two contributed to the interactive map
- Seven people attended a drop-in session to ask questions and share their experiences
- The adopted Flood Study was downloaded 49 times

Feedback received during this engagement has been passed on to Council's consultant and will assist with developing flood mitigation options for these catchments. A detailed study will be prepared and placed on exhibition towards the end of 2023.

Community feedback dates



Tuesday 7 March - Thursday 6 April 2023

Council is exploring options for managing the impact of floods in the Alexandra Canal catchment.

In 2017 Council completed the Alexandra Canal Flood Study. This involved modelling flood behaviour using rainfall data and information from the community about past storm events. The study determined:

- Where flood water will run
- How the existing drainage system will cope.
- Which properties are affected?

The results from this investigation can be found in the completed Flood Study.

What happening now?

Council has engaged specialist flood consultants, Stantec, to prepare a Floodplain Risk Management Study and Plan (the Management Plan) for Alexandra Canal. This involves reviewing the Flood Study and identifying options for reducing flood risk in the catchment.

What does the management plan propose?

The primary objective of the flood Management Plan is to identify options to mitigate and manage flood risk. This will involve consideration of options that seek to:

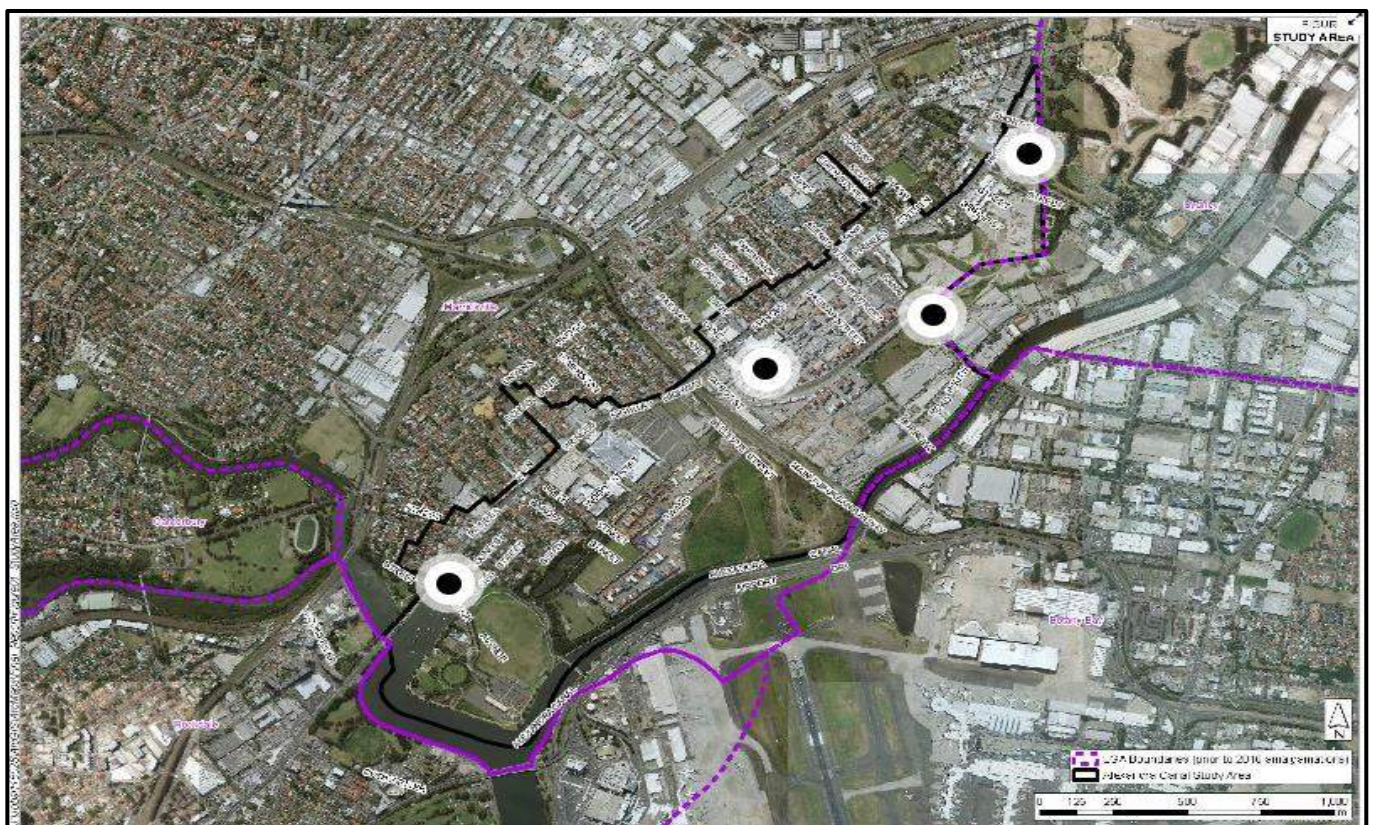
- Modify flood behaviour (e.g. levees, upgrade of stormwater systems)
- Mitigate the impact of flooding on existing properties (e.g. via floor raising)
- Control future development in the floodplain
- Guide emergency management when a flood occurs


Future development on properties that are flood affected may be subject to development controls.


What can you influence?

We asked the community to share their recent experiences of flooding in the Alexandra Canal catchment to ensure the flood management plan reflects current areas of concern.

Community members could also let us know their preferences for flood management options in the catchment area.





**Alexandra Canal Flood Study**
PDF (50.29 MB)


**Alexandra Canal Flood Planning Area Map**
PDF (1.04 MB)


Frequently asked questions

Flooding

 Why do floods occur?

 What are the risks associated with flooding?

 When was the last time it flooded?

 What can I do to prepare for a flood event?

What happens next?

The project team is using your feedback and other information to develop the final flood Management Plan. Everyone who provided feedback will be updated via email and on this project page when the Management Plan is available.

Contact us:

Have questions or want to learn more about the project? Contact us below:



Name Rafaah Georges



Phone 02 9392 5208



Email rafaah.georges@innerwest.nsw.gov.au

Timeline



Flood study completed

In 2017 Council commissioned a flood study of the Alexandra Canal catchment area.



Community consultation open

We are seeking feedback on flood management options.



Under review

Contributions to this consultation are closed for evaluation and review. The project team will report back on key outcomes.



Final report

The final outcomes of the consultation are documented here. This may include a summary of all contributions collected as well as recommendations for future action.

Managing flood risk in your neighbourhood

Alexandra Canal

Council is preparing a plan to manage the impact of floods in the Alexandra Canal area. Management options can include upgrading stormwater systems, controls on future development and guiding emergency response plans.

Find out more and have your say

To learn more, share your experiences or to discuss your preference for flood management options.

- **Online** at yoursay.innerwest.nsw.gov.au
- **In person** at an information session:
 - Wednesday 15 March 2023, 12-3pm and 5-8pm at St Peters Town Hall – Main Hall
 - Monday 20 March 2023, 12-3pm at Marrickville Library – Pavilion Hall
- **Phone** Rafaah Georges on 02 9392 5208
- **Email** floodstudies@innerwest.nsw.gov.au
- **Write to** Rafaah Georges, Inner West Council, PO Box 14 Petersham 2049

The last date to provide feedback is **Thursday 6 April 2023**.

What happens next?

All feedback will be reviewed and inform further investigations of response strategies and possible drainage upgrades. The results will be collated into a Flood Risk Management Plan that will be presented to the community in late 2023.

What else is happening?

Surveyors will be in the neighbourhood during March and April, taking levels in the flood affected areas to help with assessing the merits of the flood management options. Stantec and North Western Surveyors will be undertaking this work on behalf of Council and will be carrying authorisation from Council.

Yours faithfully,



Ryann Midei

Director Infrastructure

Alexandra Canal Resident Online Survey/ Questionnaire

Question 1

Is your property:

- ☐ Owner occupier
- ☐ Rented - by yourself
- ☐ Rented - by others
- ☐ A business
- ☐ Other

Question 2

Have you ever experienced flooding since living/working in the catchment area?

- ☐ Yes, floodwater has entered my house/business
- ☐ Yes, floodwater has entered my yard
- ☐ Yes, the road was flooded and I couldn't drive my car
- ☐ Yes, the stormwater channel reached capacity and was overflowing
- ☐ Yes, other parts of my neighbourhood have flooded
- ☐ Yes, I saw water flowing out of street drains, pits or manholes
- ☐ No, I haven't experienced flooding

Question 3

How did the flooding affect you/your business?

- ☐ Parts of my house/business building were damaged
- ☐ The contents of my house/business were damaged
- ☐ My garden, yard, and/or surrounding property were damaged
- ☐ My car(s) were damaged
- ☐ I couldn't leave the house/business
- ☐ Family members/work mates couldn't leave/return to the house/business
- ☐ The flooding disrupted my daily routine
- ☐ The flooding didn't affect me
- ☐ Not applicable - I have not experienced flooding in the catchment area
- ☐ Other

Question 4

Please upload any materials or photos to evidence the flooding you experienced.

Question 5

What do you believe to be the main cause of flooding in your area?

- ☐ Stormwater channels reaching capacity and overflowing.
- ☐ Lack of capacity in the stormwater network (e.g., pits and pipes) causing drainage systems to surcharge and backflow.
- ☐ Rainfall runoff flowing to a channel or drain.
- ☐ Other

Question 6

As a local resident who may have witnessed flooding/drainage problems, you may have your own ideas on how to reduce flood risks. Which of the following management options would you prefer? Select your 5 preferred options.

- ☐ Stormwater harvesting such as rainwater tanks.
- ☐ Retarding or detention basins; these temporarily hold water and reduce peak flows.
- ☐ Culvert / bridge / increasing pipe size and/or capacity.
- ☐ Levee banks
- ☐ Environmental channel improvements
- ☐ Diversion of channels
- ☐ Planning and flood related development controls to ensure future development does not add to the existing flood risk.

- ☐ Voluntary raising of houses to reduce flood damages by raising floor levels above a design flood.
- ☐ Voluntary purchase of highly affected properties by Council and demolition of any buildings on the property
- ☐ Education of community, providing greater awareness of potential hazards
- ☐ Flood forecasting, flood warning, evacuation planning and emergency response such as early warning systems, improved local SES capabilities/ resources or improved radio and phone communications.

Question 7 Please specify any other options you believe are suitable.

Question 8 Are you concerned about the uncertainty of future climates and the possible impacts on flooding in your area?

- ☐ Yes
- ☐ No

Question 9 Do you believe the climate is changing?

- ☐ Yes, it will have significant effects
- ☐ Yes, but the effects won't be significant
- ☐ Not at all

Question 10 Are you concerned about the impact of an uncertain climate on future flooding in the study areas?

- ☐ Yes
- ☐ Somewhat
- ☐ No

Question 11 Should Council be addressing the impacts of an uncertain future climate on flooding?

- ☐ Yes
- ☐ No

Question 12 Enter your email address here if you would like to receive a copy of your submission via email.

Question 13 Do you give permission for Cardno or Council to contact you to discuss the information you have provided us?

- ☐ Yes
- ☐ No

APPENDIX

B

MARRICKVILLE DCP 2011 – FLOOD MANAGEMENT
CONTROLS

2.22

GENERIC PROVISIONS FLOOD MANAGEMENT







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Part 2 Generic Provisions

2.22 Flood Management

A flood is an overflow or accumulation of an expanse of water that submerges land. In the sense of flowing water, the word may also be applied to the inflow of the tide. Floods are a natural and inevitable event that communities must learn to live with while minimising risks to public health and safety, property and infrastructure.

This section recognises that there are some flooding risks that require development controls and guidelines in order to reduce or eliminate their impacts.

2.22.1 Objectives

- O1** To maintain the existing flood regime and flow conveyance capacity.
- O2** To enable the safe occupation of, and evacuation from, land to which flood management controls apply.
- O3** To avoid significant adverse impacts upon flood behaviour.
- O4** To avoid significant adverse effects on the environment that would cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of the river bank/watercourse.
- O5** To limit uses to those compatible with flow conveyance function and flood hazard.
- O6** To minimise risk to human life and damage to property.

2.22.2 Land affected

This section complements Clause 6.3 (Flood planning) of Inner West Local Environmental Plan 2022 (Inner West LEP 2022). It applies to land identified on the DCP 2011 Flood Planning Area Map in Appendix 1 and land identified as being flood liable land on the DCP 2011 Flood Liable Land Map in Appendix 2.

For the purposes of this Section of the DCP:

Flood planning levels (FPLs) are the combinations of flood levels (derived from significant historical flood events or floods of specific annual exceedance probability (AEP) and freeboards selected for floodplain risk management purposes.

The Standard Flood adopted by Council is the 1% AEP or the 1 in 100 year flood. The Standard Flood has been used to derive the Flood Planning Levels.

The land identified on the DCP 2011 Flood Liable Land Map and on the DCP 2011 Flood Planning Area Map is based on information available to Council when the Plans were prepared. As new information becomes available, the DCP 2011 Flood Planning Area Map and the DCP 2011 Flood Liable Land Map may change.

2.22.2.1 Flood planning area (Cooks River)

The Flood Planning Area (Cooks River) identifies land likely to be affected by the 1% AEP flood, factoring in a rise in sea level of 400mm to the year 2050, (plus 500mm freeboard) of the Cooks River.

2.22.2.2 Flood planning area (Overland Flow)

The Flood Planning Area (Overland Flow) identifies land (in accordance with Council's Flood Tagging Policy) likely to be affected by the 1% AEP flood associated with various locations affected by local overland flooding.

2.22.2.1 Flood planning level

The Flood Planning Level is the 1% AEP flood level plus freeboard. The applicable freeboard is 500mm unless an exception is described within a specific development control.

2.22.2.2 Flood liable land

Land identified on the DCP 2011 Flood Liable Map as flood liable land identifies land within a flood planning area, and land likely to be affected by the probable maximum flood (PMF) of the Cooks River. This means that the map identifies some land as being within the Cooks River PMF area, but not within the Cooks River 100-year flood (plus 500mm freeboard) area.

NB *The 1% AEP flood is a flood that has a one per cent probability of occurring or being exceeded in any year. The probable maximum flood (PMF) is calculated to be the maximum flood likely to occur. Freeboard refers to a factor of safety and is expressed as a height above the flood level. Freeboard tends to compensate for factors such as wave action and localised hydraulic effects.*

2.22.3 Development affected

Flood management controls apply as follows:

- For land in a flood planning area, the controls apply to all development that requires development consent.
- For land that is flood liable land, but that is not in a flood planning area (land within the Cooks River PMF), the controls also apply to caravan parks, child care centres, correctional centres, emergency services facilities, hospitals, residential accommodation (except for attached dwellings, dwelling houses, secondary dwellings and semi-detached dwellings), and tourist and visitor accommodation.

2.22.4 Cooks River flood classification areas

Flood classifications have been applied to parts of the Flood Planning Area (Cooks River). The flood classifications are:

- Low hazard: Should it be necessary, people and their possessions could be evacuated by truck. Able bodied adults would have little difficulty wading out of the area.
- High hazard: Possible danger to life, evacuation by truck difficult, potential for structural damage, and social disruption and financial losses could be high.

The identified areas, and their flood classifications, are:

1. Riverside Crescent/Tennyson Street area (Marrickville and Dulwich Hill): Low hazard to high hazard.
2. Illawarra Road/Wharf Street area (Marrickville): Low hazard to high hazard.
3. Carrington Road area (Marrickville): Low hazard.
4. Bay Street area (Tempe): Low hazard to high hazard.



2.22.5 Controls

General

- C1** A *Flood Risk Management Report* must be submitted for applications that are on land identified on the Flood Planning Area Map in Appendix 1 and land identified as flood liable on the Flood Liable Land Map in Appendix 2.
- The report must be informed by flood information relevant to the subject property and surrounds, including the 1% AEP flood level, Flood Planning Level, Probable Maximum Flood (PMF) level and the Flood Hazard Category, as obtained from Council.
- The report is not required where the assessed value of the works is under \$50,000 except where, in the opinion of Council, those works are likely to substantially increase the risk of flood to the subject or adjoining or nearby sites.
- The report may be limited to a short report (Flood Risk Management Statement) for single residential dwellings, alterations and additions or change of use developments where the property is confirmed by Council as being subject only to low hazard flooding. The Flood Risk Management Statement must reference the source of flood information; specify the relevant flood information applicable to the site, then describe the proposed development and how it meets the relevant development controls.
- If Council is concerned with the apparent loss of flood storage and/or flood or overland flow paths, and/or increase in flow velocities, and/or risk of life, on any type of development, the applicant may be requested to undertake further analysis in support of the proposal and detail it in a new/revised Flood Risk Management Report.
- C2** The Flood Risk Management Report must address:
- Description of the existing stormwater drainage system, including catchment definition.
 - Extent of the 1% AEP flood event in the vicinity of the development.
 - The Flood Hazard Category affecting the subject site and surrounds. Where the site is subject to the high hazard flooding category, the Probable Maximum Flood (PMF) extent must be shown.
 - Long and cross sections showing the Flood Planning Level(s) in relationship to the floor levels of all existing and proposed components of the development.
 - Recommendations on all precautions to minimise risk to personal safety of occupants and the risk of property damage for the total development to address the flood impacts on the site during a 1% AEP flood and PMF event. These precautions must include but not be limited to the following:
 - Types of materials to be used to ensure the structural integrity of the development for immersion and impact of velocity and debris for the 1% AEP flood event and PMF (for high hazard);
 - Waterproofing methods, including electrical equipment, wiring, fuel lines or any other service pipes or connections;
 - A flood evacuation strategy (Flood Emergency Response Plan); and

- iv. On site response plan to minimise flood damage, and provide adequate storage areas for hazardous materials and valuable goods above the flood level;
 - f. Details of any flood mitigation works that are proposed to protect the development.
 - g. Supporting calculations.
 - h. The architectural/engineering plans on which the assessment is based.
 - i. The date of inspection.
 - j. The professional qualifications and experience of the author(s).
- C3** All applications for development must be accompanied by a survey plan including relevant levels to AHD (Australian Height Datum). Consideration must be given to whether structures or filling are likely to affect flood behaviour and whether consultation with other authorities is necessary.
- C4** Compliance with flood management controls must be balanced by the need to comply with other controls in this DCP.

Controls for new residential development

- C5** Floor levels (Flood Planning Levels) of habitable rooms must be a minimum of 500mm above the 1% AEP flood level at that location. For areas of minor overland flow (a depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.
- C6** Any portion of buildings below the Flood Planning Level) must be constructed from flood compatible materials (See Schedule 1).
- C7** Flood free access must be provided where practicable.

Controls for residential development – minor additions

- C8** Once-only additions with a habitable floor area of up to 30m² may be approved with floor levels below the 1% AEP flood level at that location if the applicant can demonstrate that no practical alternatives exist for constructing the extension above the 1% AEP flood level.
- C9** Additions greater than 30m² will be considered against the requirements for new residential development (refer C5, C6, and C7).
- C10** Any portion of buildings below the Flood Planning Level must be constructed from flood compatible materials.

Controls for non-habitable additions or alterations

- C11** All flood sensitive equipment must be located above the Flood Planning Level at that location.
- C12** Any portion of buildings below the Flood Planning Level must be built from flood compatible materials.

Controls for new non-residential development

- C13** Floor levels (except for access-ways) must be at least 500mm above the 1% AEP flood level, or the buildings must be flood-proofed to at least 500mm above the 1% AEP flood level. For areas of minor overland flow (a depth of 300mm or less or overland flow of 2cum/sec or less) a lower freeboard of 300mm may be considered on its merits.
- C14** Flood-free access must be provided where practicable.



Controls for non-residential development – additions

- C15** Where the proposed development is for an addition to an existing building within the Flood Planning Area, the development may be approved with floor levels below the 1% AEP flood Level if the applicant can demonstrate that all practical measures will be taken to prevent or minimise the impact of flooding. In determining the required floor level, matters which will be considered include:
- The nature of the proposed landuse;
 - The frequency and depth of possible flooding;
 - The potential for life and property loss;
 - The suitability of the building for its proposed use; and
 - Whether the filling of the site or raising of the floor levels would render the development of the site impractical or uneconomical.
- C16** Any portion of the proposed addition below the 1% AEP must be built from flood compatible materials.

Controls for change of use of existing buildings

- C17** Development consent for change of use of an existing building with floor levels below the 1% AEP flood level will only be given where there is no foreseeable risk of pollution associated with the proposed use of the building in the event that 1% AEP flood event occurs.
- C18** In determining whether to grant development consent for change of use of an existing building with floor levels below the 1% AEP flood level, consideration will be given to whether the proposed development would result in increased flood risk for the property on which the building is located, or other land. In this regard, the following matters will be considered:
- The nature of the proposed use and the manner in which it is proposed to be carried out within the building or on the land; and
 - The foreseeable risk of pollution associated with the proposed use of the building/land in the event that the 1% AEP flood event occurs.

Controls for subdivision

- C19** Development consent for the subdivision of flood liable land may depend on whether the land to which the proposed development relates is unsuitable for any development made likely by the subdivision, by reason of the land likely to be subject to flooding.
- C20** Development consent for the subdivision of flood liable land may depend on whether the carrying out of the subdivision and any associated site works would:
- Adversely impede the flow of flood water on the land or land in its vicinity;
 - Imperil the safety of persons on that land or land in its vicinity in the event of the land being inundated with flood water; and
 - Aggravate the consequences of flood water flowing on that land or land in its immediate vicinity with regard to erosion or siltation.

Controls for filling of land within the Flood Planning Area

- C21** Development consent will not be granted to filling of flood ways or high flood hazard areas. Consideration will only be given to granting development consent to the filling of other flood liable land where:
- Flood levels are not increased by more than 10mm by the proposed filling.
 - Downstream velocities are not increased by more than 10% by the proposed filling.
 - Proposed filling does not redistribute flows by more than 15%.
 - The potential for cumulative effects of possible filling proposals in that area is minimal.
 - The development potential of surrounding properties is not adversely affected by the filling proposal.
 - The flood liability of buildings on surrounding properties is not increased.
 - The filling creates no local drainage flow/runoff problems.

NB *Where the proposal has the potential to increase flood levels, depths, velocities and/or the risk to life or property, through loss of flood storage and/or blockage/redirection of overland flowpaths, the Flood Risk Management Report supporting the development application must include detailed flood analysis. Such analysis should address compliance with all relevant development controls and include survey cross-sections to provide representative topographic information. The proponent should approach Council to determine available Council flood studies for the area, with the analysis based on or calibrated against relevant studies. In some cases, flood model data can be obtained from Council, subject to application and payment of fees.*

Controls for land uses on flood liable land identified on the DCP 2011 Flood Liable Land Map

- C22** A site emergency response flood plan must be prepared in case of a PMF flood.
- C23** Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the State Emergency Service (SES) or other authorised emergency services personnel.
- C24** Reliable access for pedestrians or vehicles must be provided from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF.

Controls for garages, carports, open car parks and basement garages

- C25** The floor level of new enclosed garages must be at or above the 1% AEP flood level plus 200mm. In extenuating circumstances, consideration may be given to a floor level at a lower level, being the highest practical level but no lower than 180mm below the 1% AEP flood level, where it can be demonstrated that providing the floor level at the Flood Planning Level is not practical within the constraints of compliance with Australian Standard AS/NZS 2890.1 Parking facilities as amended.
- C26** The floor levels of open car park areas and carports must meet the same criteria as above for garages. In extreme circumstances, for single dwelling residential development, a floor level below the 1% AEP flood



level minus 180mm may be accepted for a single car space, subject to bollards being provided along the 'free' perimeter (excluding the vehicle entry on one side only) at 1.2m intervals and the floor level being raised as high as practical within the constraints of compliance with Australian Standard AS/NZS 2890.1 Parking facilities as amended.

- C27** On properties with a low flood hazard classification, basement (below natural ground level) car parking must have all access and potential water entry points above the Flood Planning Level, and a clearly signposted flood free pedestrian evacuation route provided from the basement area separate to the vehicular access ramps. For basement car parking in properties affected by High Hazard flooding further considerations will apply.
- C28** Basement garages must include:
- a. Suitable pumps must be provided within the garage to allow for the drainage of stormwater should the basement garage become inundated during flooding.
 - b. Adequate flood warning systems, signage and exits must be available to allow safe and orderly evacuation without increased reliance upon the SES or other authorised emergency services personnel.
- C29** For parking areas servicing more than two parking spaces, reliable access for pedestrians must be provided from all parking areas, to a safe haven which is above the PMF.

2.22.6 SCHEDULE 1 – Flood compatible materials

Building component	Flood compatible material
Flooring and sub-floor	<ul style="list-style-type: none"> concrete slab-on-ground monolith suspended reinforced concrete slab
Floor covering	<ul style="list-style-type: none"> clay tiles concrete, precast or in situ concrete tiles epoxy, formed-in-place mastic flooring, formed-in-place rubber sheets or tiles with chemicals-set-adhesive silicone floors formed-in-place vinyl sheets or tiles with chemical-set adhesive ceramic tiles, fixed with mortar or chemical-set adhesive asphalt tiles, fixed with water resistant adhesive
Wall structure	<ul style="list-style-type: none"> solid brickwork, blockwork, reinforced, concrete or mass concrete
Roofing structure (for situations where the relevant flood level is above the ceiling)	<ul style="list-style-type: none"> reinforced concrete construction galvanised metal construction
Doors	<ul style="list-style-type: none"> solid panel with water proof adhesives flush door with marine ply filled with closed cell foam painted metal construction aluminium or galvanised steel frame
Wall and ceiling linings	<ul style="list-style-type: none"> fibro-cement board brick, face or glazed clay tile glazed in waterproof mortar concrete concrete block steel with waterproof applications stone, natural solid or veneer, waterproof grout glass blocks glass plastic sheeting or wall with waterproof adhesive
Insulation windows	<ul style="list-style-type: none"> foam (closed cell types) aluminium frame with stainless steel rollers or similar corrosion and water resistant material
Nails, bolts, hinges and fittings	<ul style="list-style-type: none"> brass, nylon or stainless steel removable pin hinges hot dipped galvanised steel wire nails or similar



SCHEDULE 1: Flood compatible materials (cont.)

Electrical and mechanical equipment

For development constructed on land to which this section of the DCP applies, the electrical and mechanical materials, equipment and installation must conform to the following requirements:

Main power supply

Subject to the approval of the relevant authority the incoming main commercial power service equipment, including all metering equipment, must be located above the relevant flood level. Means must be available to easily disconnect the dwelling from the main power supply.

Wiring

All wiring, power outlets, switches, must be to the maximum extent possible, located above the maximum flood level. All electrical wiring installed below this level must be suitable for continuous underwater immersion and must contain no fibrous components. Each leakage circuit-breaker (core balance relays) must be installed. Only submersible type splices must be used below maximum flood level. All conduits located below the relevant designated flood level must be so installed that they will be self-draining if subjected to flooding.

Equipment

All equipment installed below or partially below the relevant flood level must be capable of disconnection by a single plug and socket assembly.

Reconnection

Should any electrical device and/or part of the wiring be flooded it must be thoroughly cleaned or replaced and checked by an approved electrical contractor before reconnection.

Heating and air conditioning systems

Where viable, heating and air conditioning systems should be installed in areas and spaces of the development above maximum flood level. When this is not feasible, every precaution must be taken to minimise the damage caused by submersion according to the following guidelines:

Fuel

Heating systems using gas or oil as fuel must have a manually operated valve located in the fuel supply line to enable fuel cut-off.

Installation

Heating equipment and fuel storage tanks must be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. All storage tanks must be vented to an elevation of 600mm above the relevant flood level.

Ducting

All ductwork located below the relevant flood level must be provided with openings for drainage and cleaning. Self-draining may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, a closure assemble operated from above relevant flood level must protect the ductwork.

Appendix 1 - DCP 2011 Flood Planning Area Map

See the attached map.



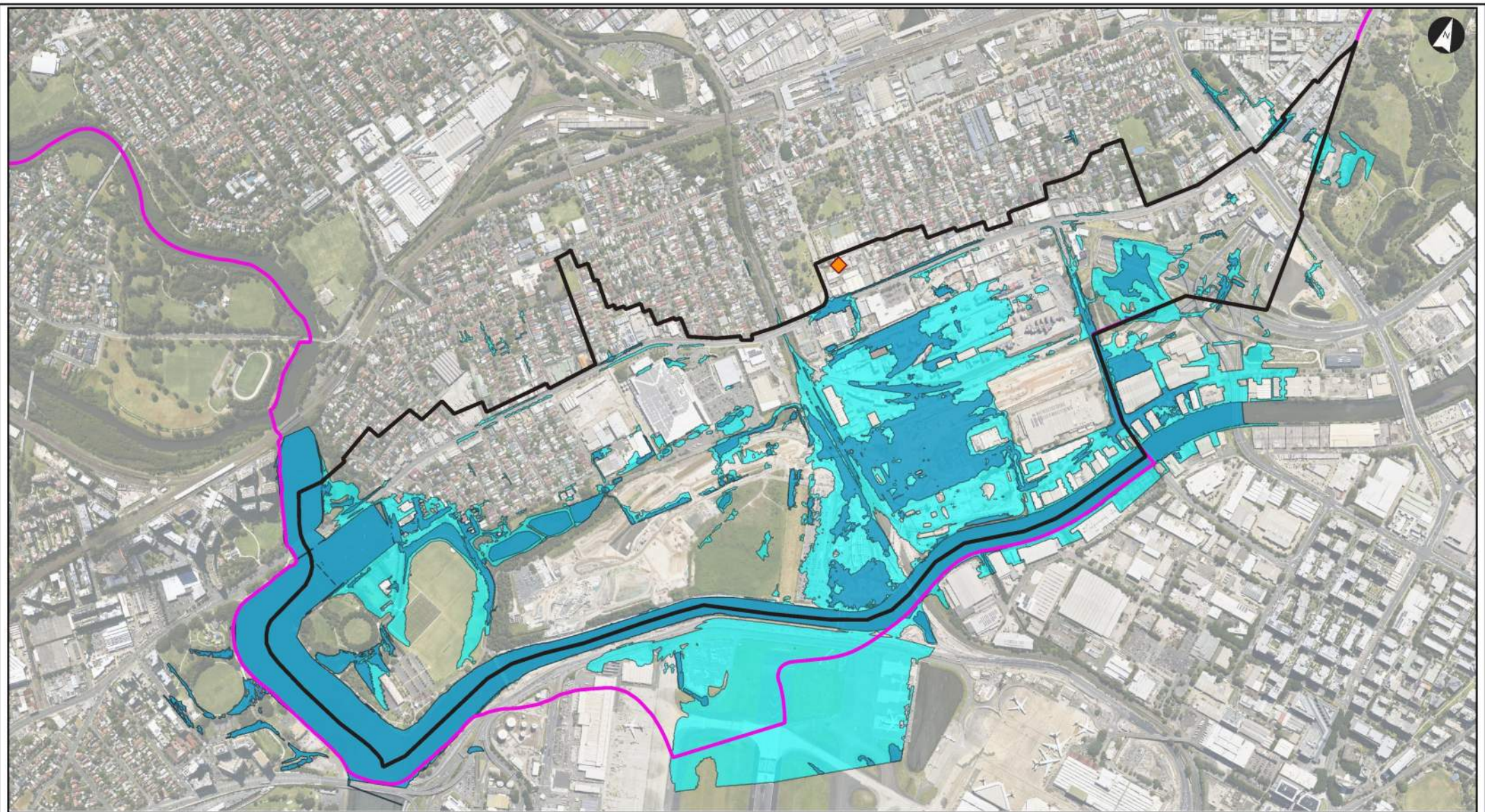
Appendix 2 - DCP 2011 Flood Liable Land Map

See the attached map.

APPENDIX

C

EMERGENCY MANAGEMENT MAPS



Emergency Services within the Study Area with 1% AEP and PMF Extent

Project: Alexandria Canal Flood Risk Management Study &
Plan

Client: Inner West Council
Project Code: NW30095

Drawn By: Habba Rahimi, Checked By: Alireza Pouya
Date: (2023-06-26)
Figure No: 1

Legend

- Alexandria Canal Study Area
- Inner West LGA Boundary
- 1% AEP Flood Extent
- PMF Flood Extent

Location of Emergency Services

- ◆ Ambulance
- ◆ Helicopter Emergency Base
- ◆ Police Station
- ◆ SES

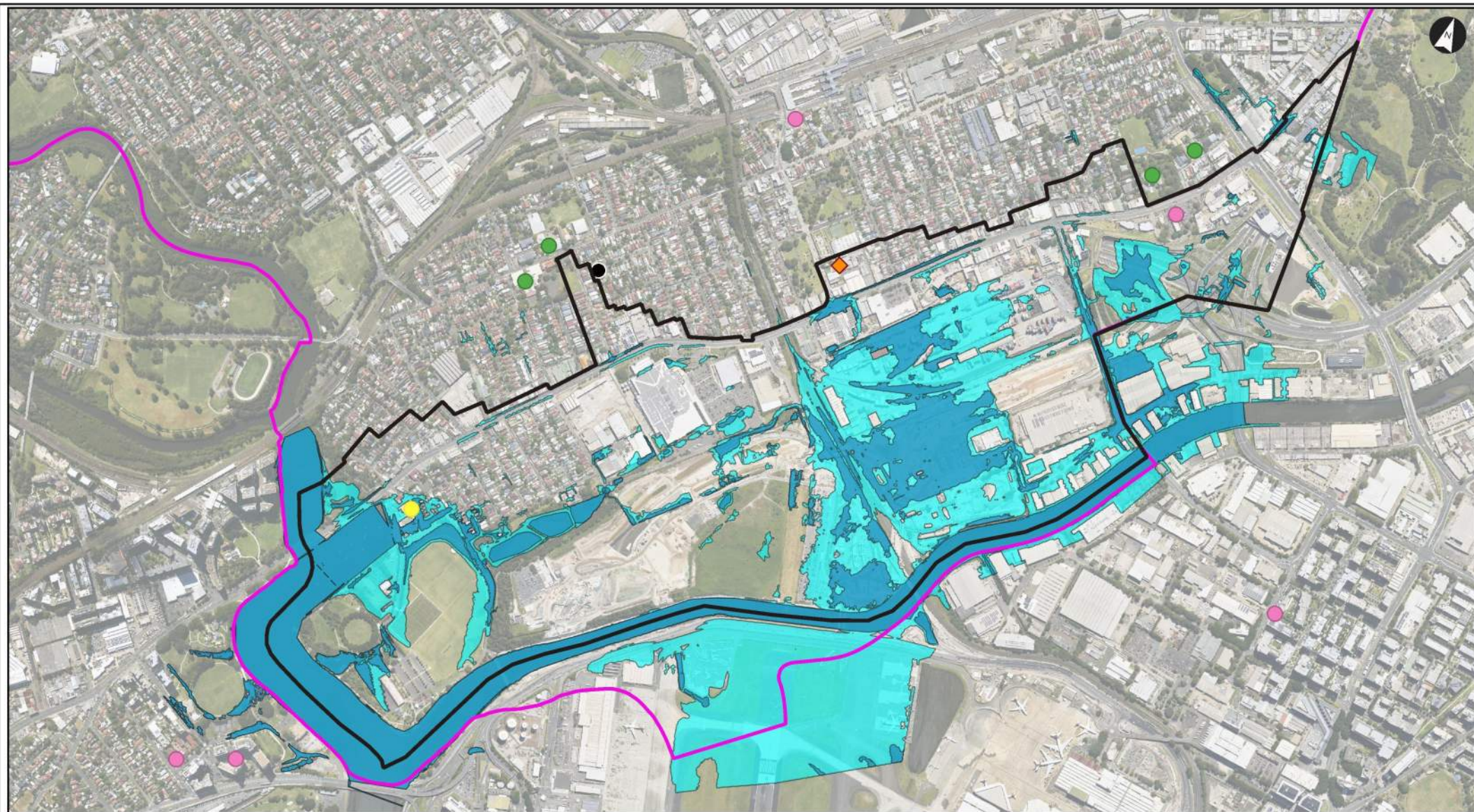
Notes:
1. Map displayed in EPSG:28356

References:
1. Aerial Imagery [Metromap, March 2023]

DRAFT - Not For Construction

Scale at A3: 1:10000





Vulnerable Development and Emergency Services within the Study Area with 1% AEP and PMF Extent

Project: Alexandria Canal Flood Risk Management Study & Plan

Client: Inner West Council
Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya
Date: (2023-06-26)

Figure No: 2

Legend

- Alexandria Canal Study Area
- Inner West LGA Boundary
- 1% AEP Flood Extent
- PMF Flood Extent

Location of Emergency Services

- Ambulance
- Helicopter Emergency Base
- Police Station

- SES

Location of Vulnerable development

- Aged care
- Day care
- Hotel
- School

Notes:

1. Map displayed in EPSG:28356

References:

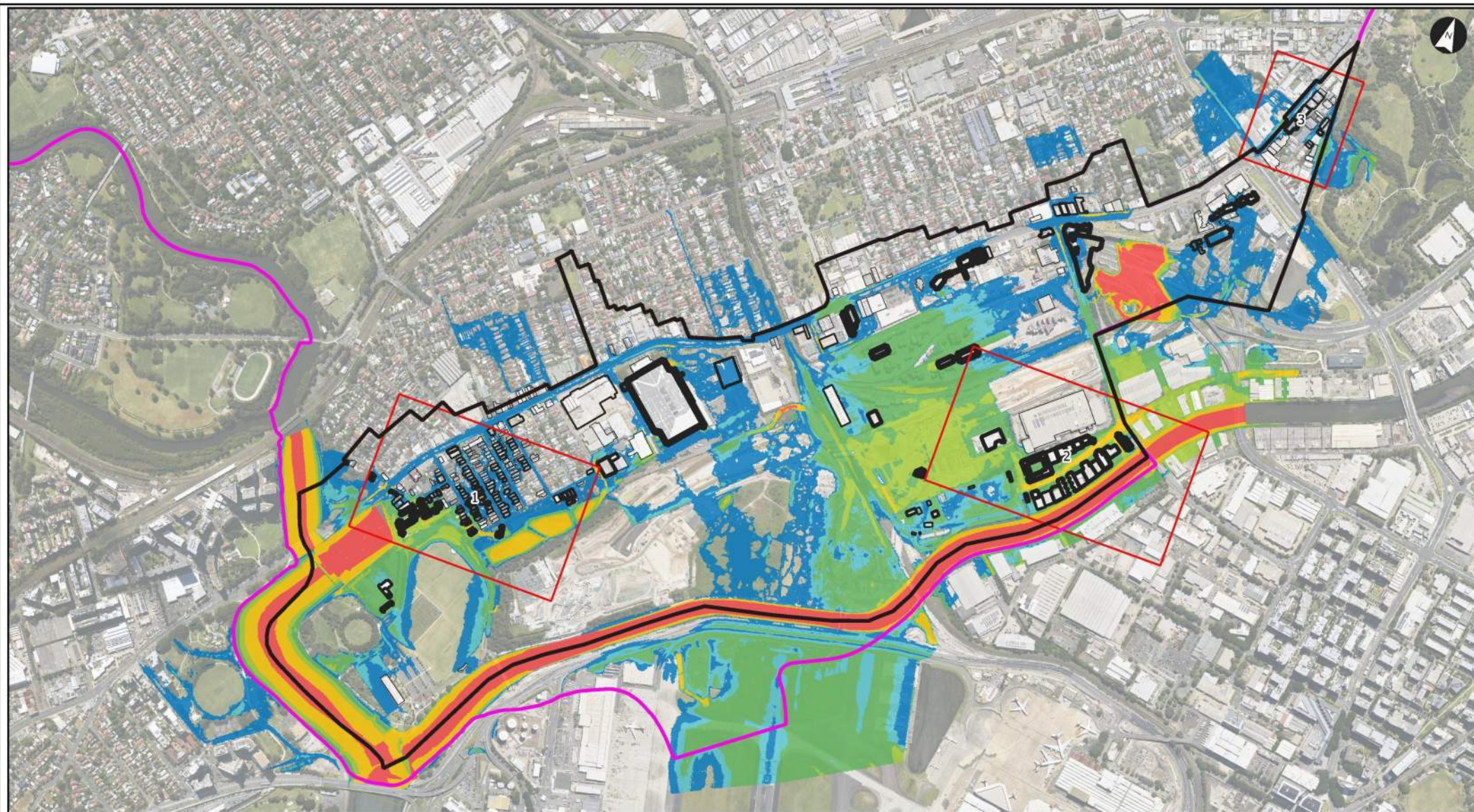
1. Aerial Imagery [Metromap, March 2023]

DRAFT - Not For Construction

0 0.3 0.6 km

Scale at A3: 1:10000





Emergency Management Hotspot Overview

Project: Alexandria Canal Flood Risk Management Study & Plan

Client: Inner West Council
 Project Code: NW30095
 Drawn By: Habiba Rahimi, Checked By: Alireza Pouya
 Date: (2023-06-26)
 Figure No: 1

Legend

- Alexandria Canal Study Area
- Inner West Council LGA Boundary
- Emergency Hotspot
- Overfloor Flooding Depth (m)**
- <0
- 0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6

- 0.6 - 0.8
- 0.8 - 1
- >1
- Hazard Category**
- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.

- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people.
- H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [Metromap, March 2023]

DRAFT - Not For Construction



Scale at A3: 1:10000





Emergency Management

Hotspot 1 20% AEP

Project: Alexandra Canal Flood Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya
Date: (2023-07-05)

Figure No: 1



Legend

 Alexandra Canal study Area

Overfloor Flooding Depth (m)

 <0

 0 - 0.2

 0.2 - 0.4

 0.4 - 0.6

Evacuation Routes

Vehicular

 Commercial Low Flood Island

 Low Flood Island

Hazard Category

 H1 - Generally safe for vehicles, people and buildings.

 H2 - Unsafe for small vehicles.

 H3 - Unsafe for vehicles, children and the elderly.

 H4 - Unsafe for vehicles and people.

 H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

 H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.09 0.18 km

Scale at A3: 1:19987





Emergency Management

Hotspot 1 1% AEP

Project: Alexandra Canal Road Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habba Rahimi, Checked By: Alireza Pouya

Date: (2023-07-05)

Figure No: 2



Legend

 Alexandra Canal study Area

Overfloor Flooding Depth (m)

- <0
- 0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6

Evacuation Routes

Vehicular

 Commercial Low Flood Island

 Low Flood Island

Hazard Category

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.

- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people.
- H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
- H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.09 0.18 km

Scale at A3: 1:19987





Emergency Management

Hotspot 1 PMF

Project: Alexandra Canal Flood Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya

Date: [2023-07-05]

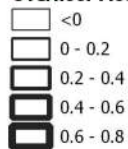
Figure No: 3



Legend

Alexandra Canal study Area

Overfloor Flooding Depth (m)



Evacuation Routes

Vehicular

Commercial Low Flood Island

Low Flood Island

Hazard Category

H1 - Generally safe for vehicles, people and buildings.
H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.
H4 - Unsafe for vehicles and people.
H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction



Scale at A3: 1:19987





Emergency Management

Hotspot 2 20% AEP

Project: Alexandra Canal Road Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya

Date: (2023-07-05)

Figure No: 4



Legend

 Alexandra Canal study Area

Overfloor Flooding Depth (m)

 <0

Evacuation Routes

→ Vehicular

 Commercial Low Flood Island

Hazard Category

 H1 - Generally safe for vehicles, people and buildings.

 H2 - Unsafe for small vehicles.

 H3 - Unsafe for vehicles, children and the elderly.

 H4 - Unsafe for vehicles and people.

 H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

 H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery (MetroMap, 2023)

DRAFT - Not For Construction
0 0.09 0.18 km

Scale at A3: 1:19987





Emergency Management

Hotspot 2 1% AEP

Project: Alexandra Canal Flood Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya

Date: [2023-07-05]

Figure No: 5



Legend

Alexandra Canal study Area

Overfloor Flooding Depth (m)

<0

0 - 0.2

Evacuation Routes

Vehicular

Commercial Low Flood Island

Hazard Category

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people.

H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.09 0.18 km

Scale at A3: 1:19987





Emergency Management

Hotspot 2 PMF

Project: Alexandra Canal Road Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habba Rahimi, Checked By: Alireza Pouya

Date: (2023-07-05)

Figure No: 6



Legend

 Alexandra Canal study Area

Overfloor Flooding Depth (m)

 <0

 0 - 0.2

 0.2 - 0.4

 0.4 - 0.6

 0.6 - 0.8

 0.8 - 1

 >1

Evacuation Routes

 Vehicular

 Commercial Low Flood Island

Hazard Category

 H1 - Generally safe for vehicles, people and buildings.

 H2 - Unsafe for small vehicles.

 H3 - Unsafe for vehicles, children and the elderly.

 H4 - Unsafe for vehicles and people.

 H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

 H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery (MetroMap, 2023)

DRAFT - Not For Construction



Scale at A3: 1:19987





Emergency Management

Hotspot 3 20%AEP

Project: Alexandra Canal Flood Management Study and Plan Risk:

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alireza Pouya

Date: (2023-07-05)

Figure No: 7



Legend

Alexandra Canal Study Area

Overfloor Flooding Depth (m)

<0

0 - 0.2

Evacuation Routes

Vehicular

Commercial Low Flood Island

Low Flood Island

Hazard Category

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people.

H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

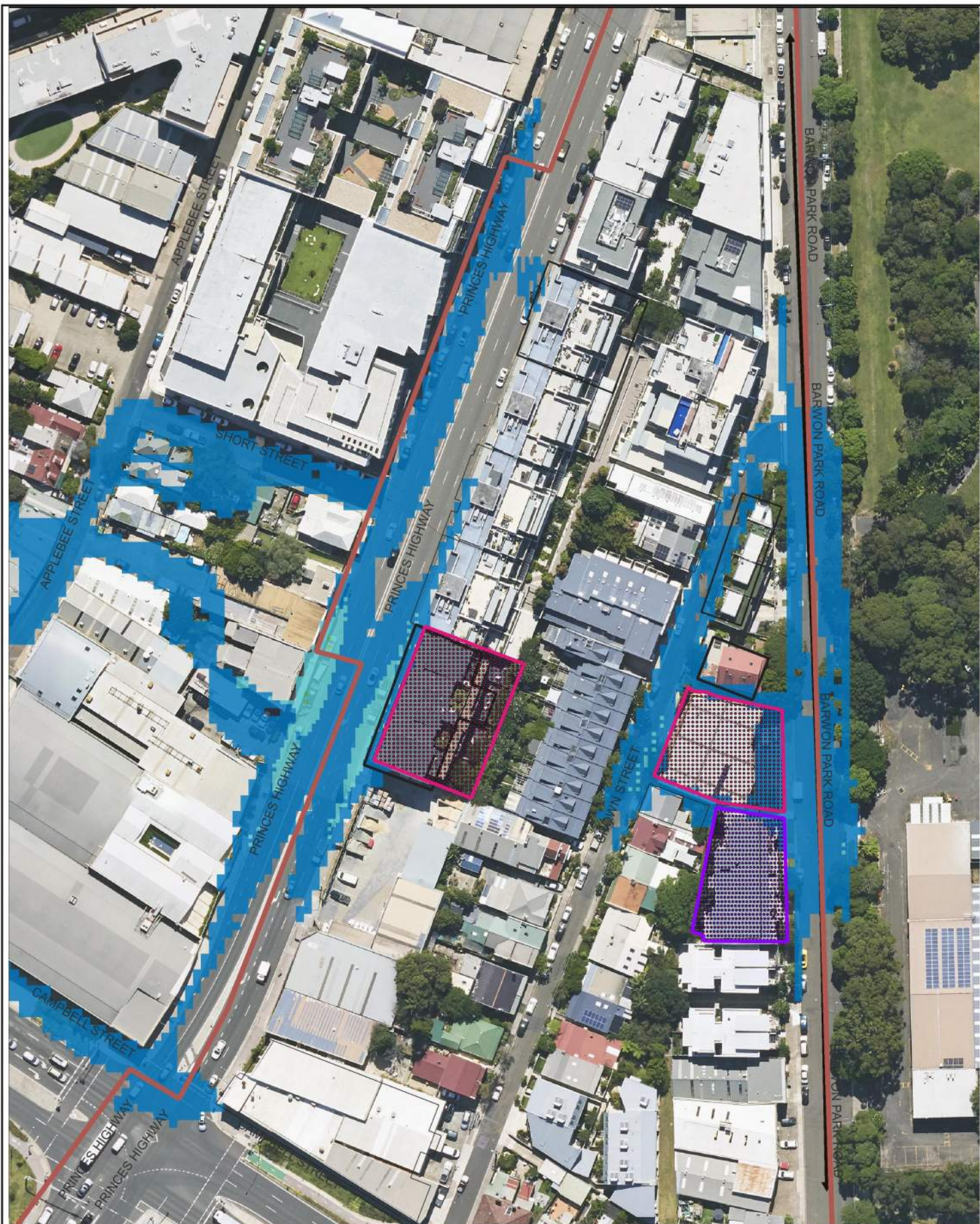
1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.02 0.04 km

Scale at A3: 1:29044





Emergency Management

Hotspot 3 1% AEP

Project: Alexandra Canal Flood Management Study and Plan Risk

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alkeza Pouya

Date: [2023-07-05]

Figure No: 8



Legend

Alexandra Canal Study Area

Overfloor Flooding Depth (m)



Evacuation Routes



Hazard Category



Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.02 0.04 km

Scale at A3: 1:29044





Emergency Management

Hotspot 3 PMF

Project: Alexandra Canal Flood Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Habiba Rahimi, Checked By: Alreza Pouya

Date: (2023-07-05)

Figure No: 9



Legend

Alexandra Canal Study Area

Overfloor Flooding Depth (m)

<0

0 - 0.2

0.2 - 0.4

0.4 - 0.6

Evacuation Routes

Vehicle

Commercial Low Flood Island

Low Flood Island

Hazard Category

H1 - Generally safe for vehicles, people and buildings.

H2 - Unsafe for small vehicles.

H3 - Unsafe for vehicles, children and the elderly.

H4 - Unsafe for vehicles and people.

H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.

H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [MetroMap, 2023]

DRAFT - Not For Construction

0 0.02 0.04 km

Scale at A3: 1:29044



APPENDIX

D

PRELIMINARY FLOOD OPTIONS MAPS



Preliminary Mitigation Options Hotspot 1

Project: Alexandra Canal Floodplain Risk Management Study
and Plan

Client: Inner West Council
Project Code: NW30095
Drawn By: Anson Chang, Checked By: Alireza Pouya
Date: (2023-07-05)
Figure No: 1

Legend

- Existing Council Modelled Stormwater Network
- Cadastre
- Inner West Council LGA Boundary
- Alexandra Canal Study Area
- Preliminary Option Type
- Channel Upgrades
- Detention Basin
- Drainage Upgrades
- Road Lowering
- Drainage Maintenance

Flood Depth (m)
0.00 to 0.30
0.30 to 0.50
0.50 to 0.70
0.70 to 1.00
1.00 to 1.50
> 1.50

Notes:

1. Map displayed in EPSG:28356

References:

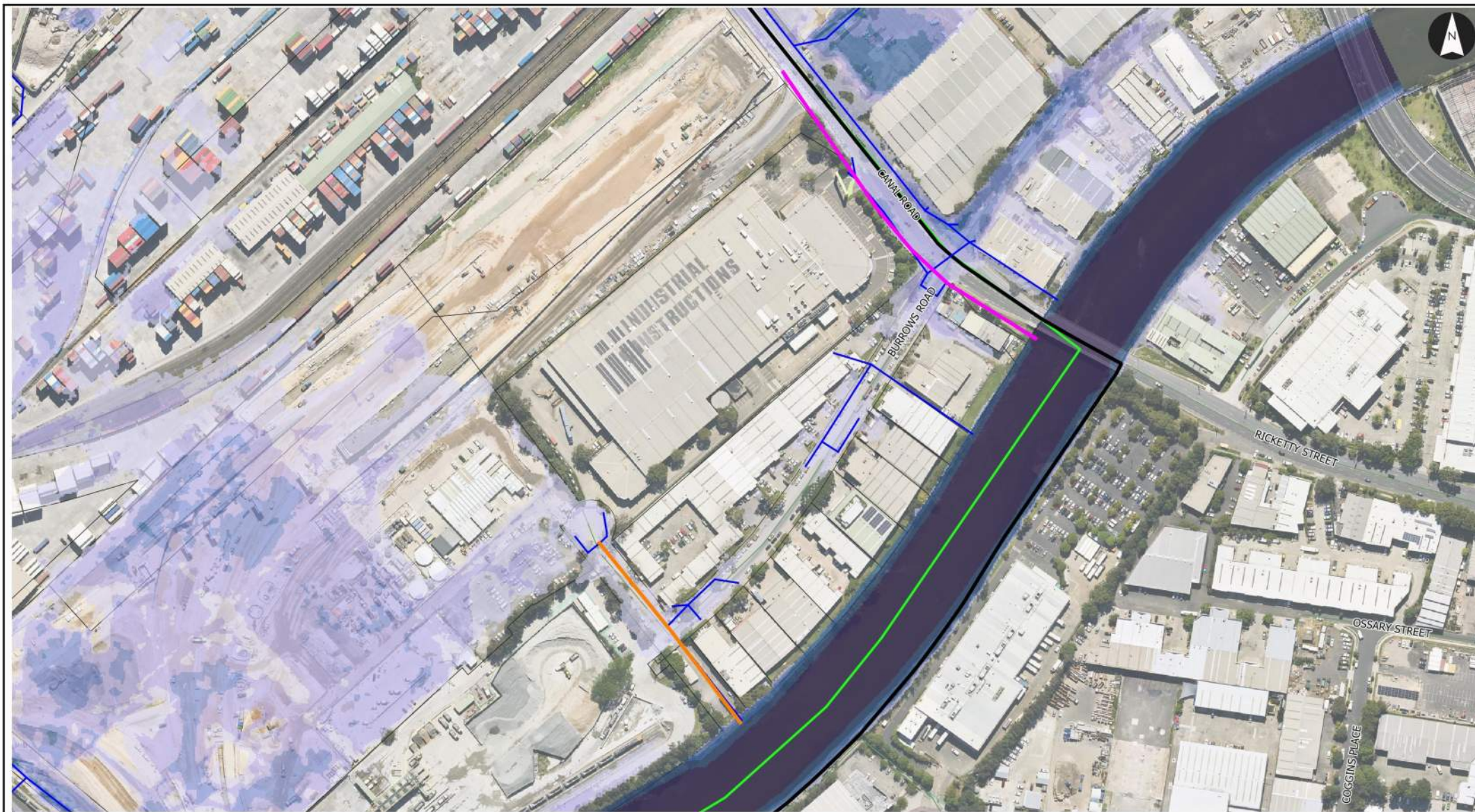
1. Aerial Imagery [Metromap, 2023]

DRAFT - Not For Construction



Scale at A3: 1:3200





Preliminary Mitigation Options Hotspot 2

Project: Alexandra Canal Floodplain Risk Management Study and Plan

Client: Inner West Council
 Project Code: NW30095
 Drawn By: Anson Chang, Checked By: Alireza Pouya
 Date: (2023-07-05)
 Figure No: 2

Legend

- | | |
|--|--|
| <ul style="list-style-type: none"> Editing Council Modeled Stormwater Network Cadastral Inner West Council LGA Boundary Alexandra Canal Study Area | <ul style="list-style-type: none"> Preliminary Option Type Channel Upgrades Detention basin Drainage Upgrades Road Lowering Drainage Maintenance |
|--|--|

Flood Depth (m)
0.00 to 0.10
0.10 to 0.30
0.30 to 0.50
0.50 to 0.70
0.70 to 1.00
1.00 to 1.50
> 1.50

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery (Metromap, 2023)

DRAFT - Not For Construction



Scale at A3: 1:2500





Preliminary Mitigation Options Hotspot 3

Project: Alexandra Canal Floodplain Risk Management Study and Plan

Client: Inner West Council

Project Code: NW30095

Drawn By: Anson C, Checked By: Alireza Pouya

Date: (2023-07-05)

Figure No: 3

Legend

- Existing Council Modelled Stormwater Network
- Cadastre
- Inner West Council LGA Boundary
- Alexandra Canal Study Area
- Preliminary Option Type
- Channel Upgrades
- Detention Basin
- Drainage Upgrades
- Road Lowering
- Drainage Maintenance

Flood Depth (m)
0.00 to 0.10
0.10 to 0.30
0.30 to 0.50
0.50 to 0.70
0.70 to 1.00
1.00 to 1.50
> 1.50

Notes:

1. Map displayed in EPSG:28356

References:

1. Aerial Imagery [Metromap, 2023]

DRAFT - Not For Construction



Scale at A3: 1:1600



APPENDIX

E

DETAILED FLOOD OPTIONS MAPS



Alexandra Canal Base Case -
PM6 Overview

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 1



Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- IWC LGA Boundary
- Study Area
- Cadastre

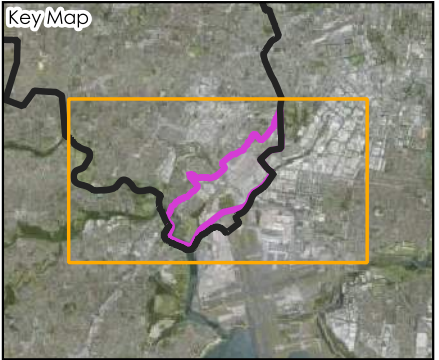
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

180 0 180 360 540 720 m

Scale at A3: 1:15000





Alexandra Canal Base Case 20% AEP
PM6 Pit and Pipes Unblocked

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 2

Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

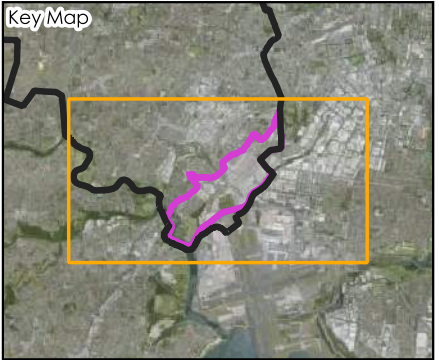
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

180 0 180 360 540 720 m

Scale at A3: 1:15000





Alexandra Canal Base Case 5% AEP
PM6 Pit and Pipes Unblocked

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 3

Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map



Scale at A3: 1:15000





Alexandra Canal Base Case 2% AEP
PM6 Pit and Pipes Unblocked

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 4

Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

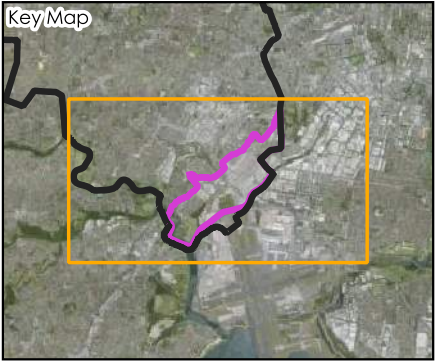
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

180 0 180 360 540 720 m

Scale at A3: 1:15000





Alexandra Canal Base Case 1% AEP
PM6 Pit and Pipes Unblocked

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 5

Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

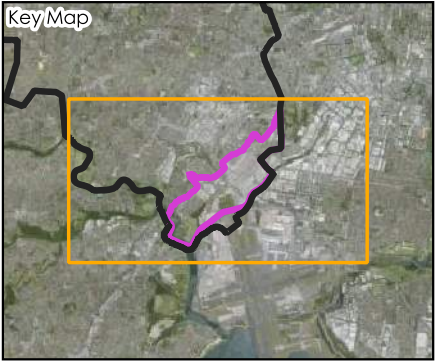
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

180 0 180 360 540 720 m

Scale at A3: 1:15000





Alexandra Canal Base Case PMF
PM6 Pit and Pipes Unblocked

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 6

Legend

- Unblocked Pipes
- Blocked Pipes, Now Unblocked
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

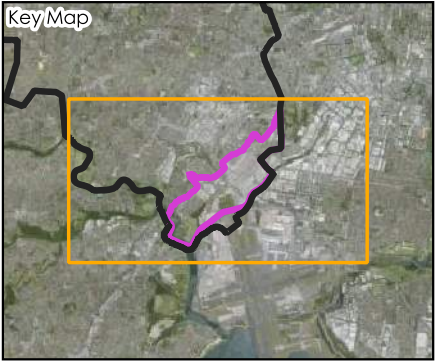
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

180 0 180 360 540 720 m

Scale at A3: 1:15000





Alexandra Canal Option -
AC4 v6 Overview

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 7



Legend

	Proposed Drainage		IWC LGA Boundary		Cadastre
	Existing Pits and Pipes		Study Area		

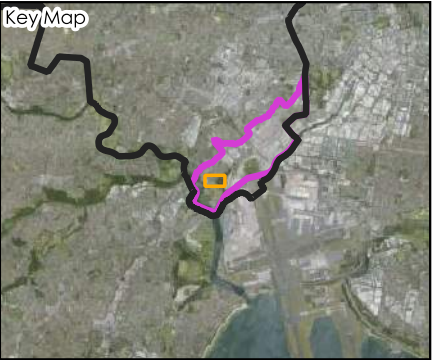
Notes:
1. Map displayed in EPSG:28356

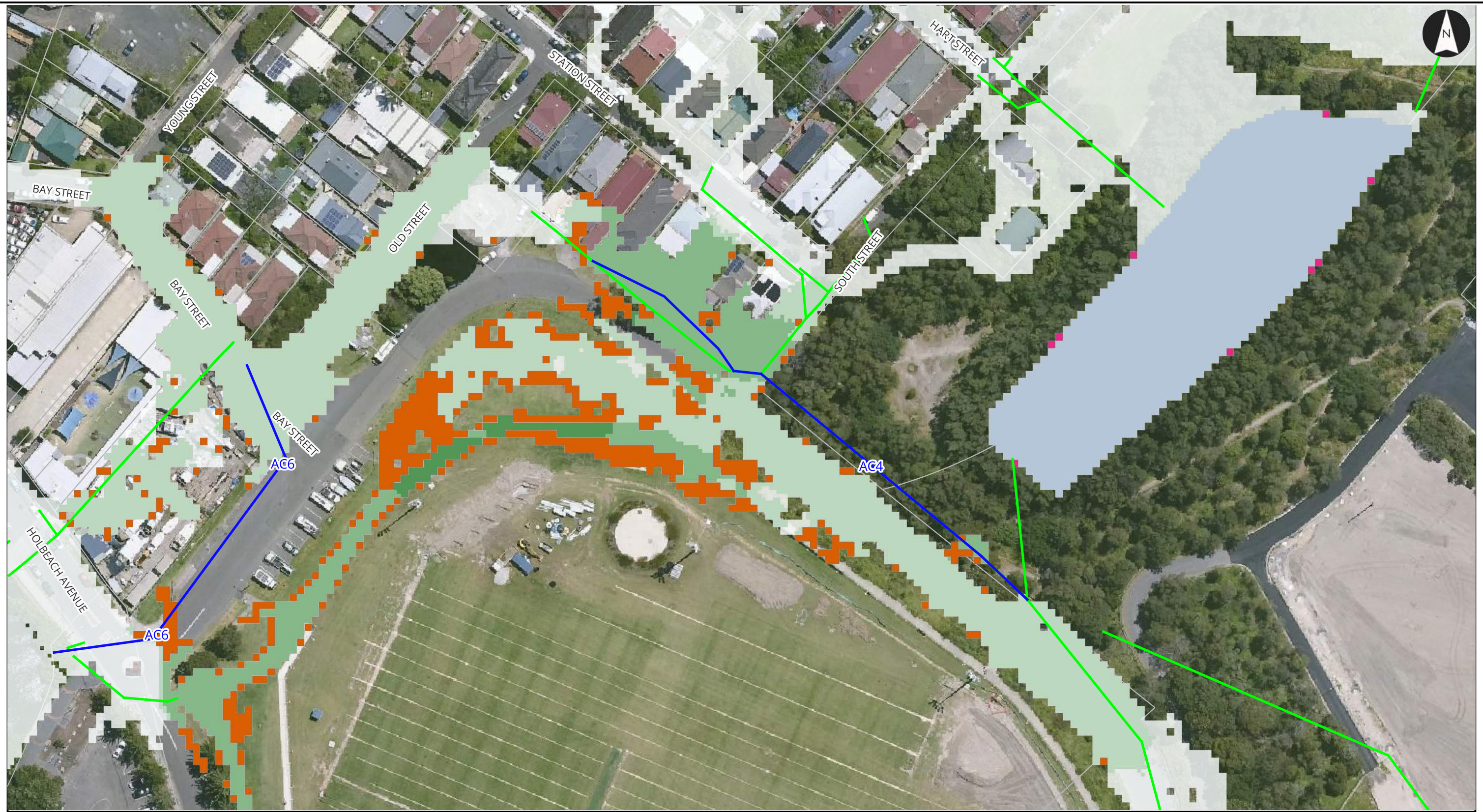
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:1000





Alexandra Canal Option 20% AEP AC4 v6 Station Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 8

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

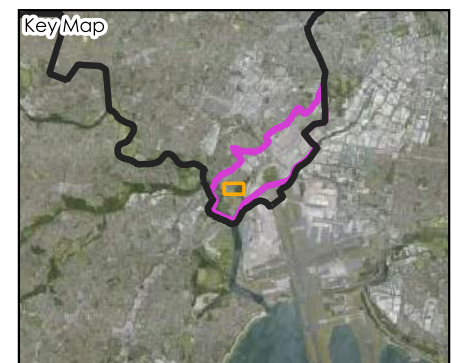
- IWC LGA Boundary
- Study Area
- Cadastre

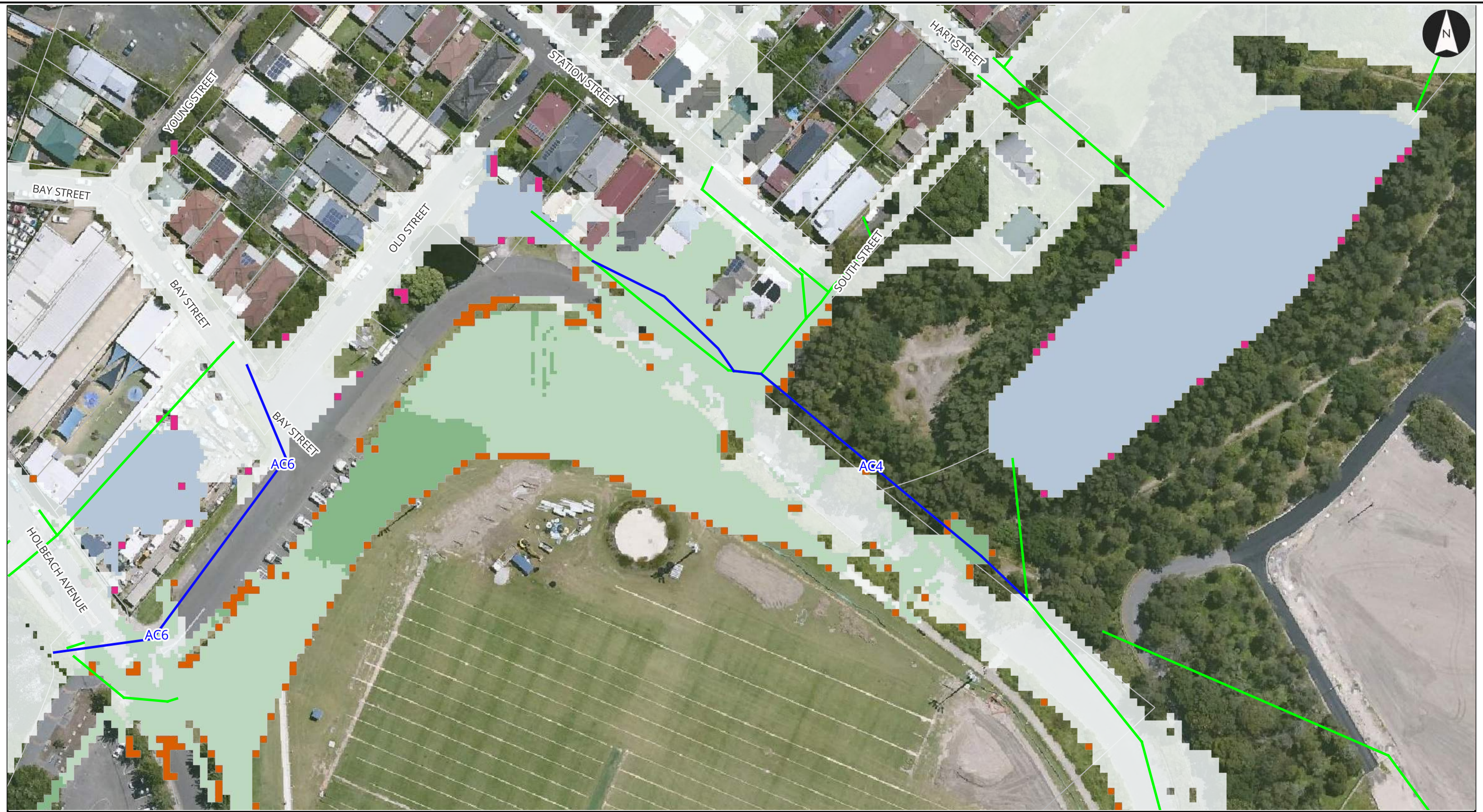
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction
10 0 10 20 30 40 m

Scale at A3: 1:1000





Alexandra Canal Option 5% AEP
AC4 v6 Station Street Drainage
Upgrade

Project: Alexandra Canal FRMS&P

Client: Inner West Council

Project Code: 304600163

Drawn By: AC, Checked By: MG

Date: (2023-12-22)

Figure No: 9

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)

- < -0.50
- 0.50 to -0.20
- 0.20 to -0.10
- 0.10 to -0.05
- 0.05 to -0.01
- 0.01 to 0.01
- 0.01 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.50
- > 0.50

- IWC LGA Boundary
- Study Area
- Cadastre

Notes:

1. Map displayed in EPSG:28356

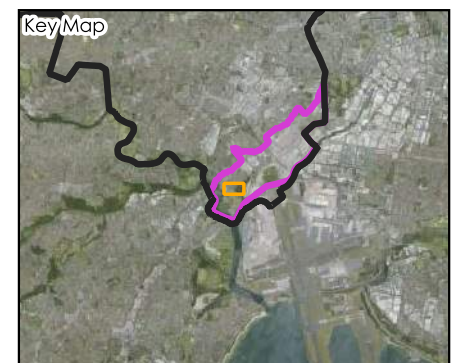
References:

1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option 2% AEP
AC4 v6 Station Street Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 10

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

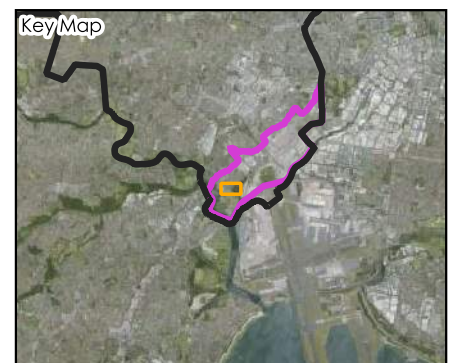
Notes:
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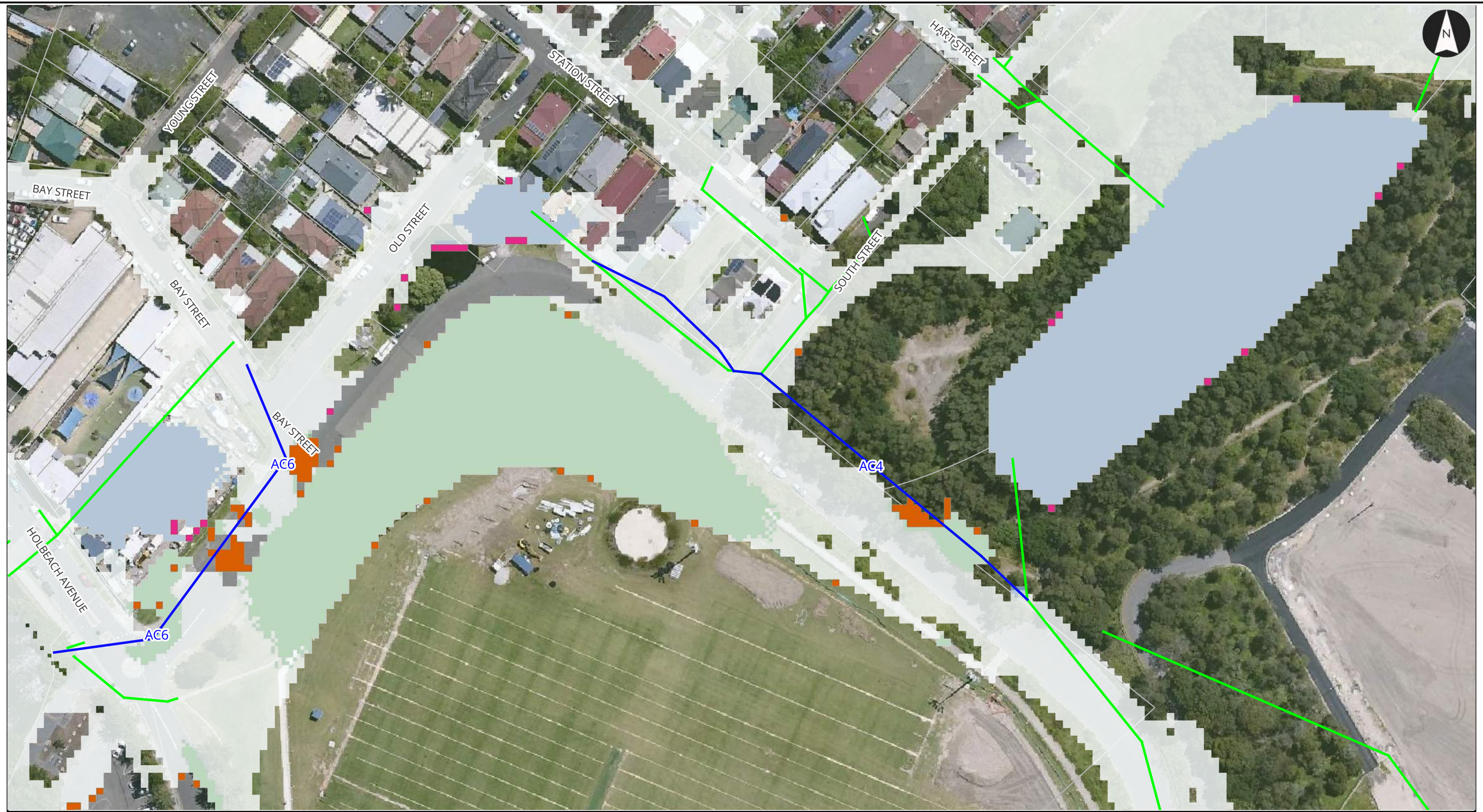
References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option 1% AEP
AC4 v6 Station Street Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 11

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

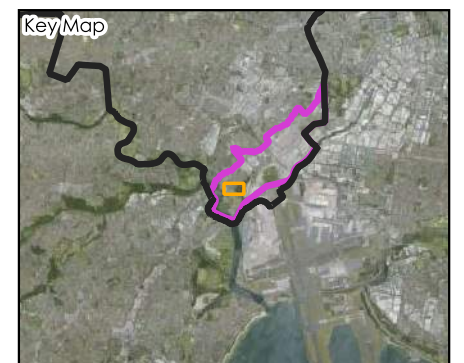
Notes:
1. Map displayed in EPSG:28356

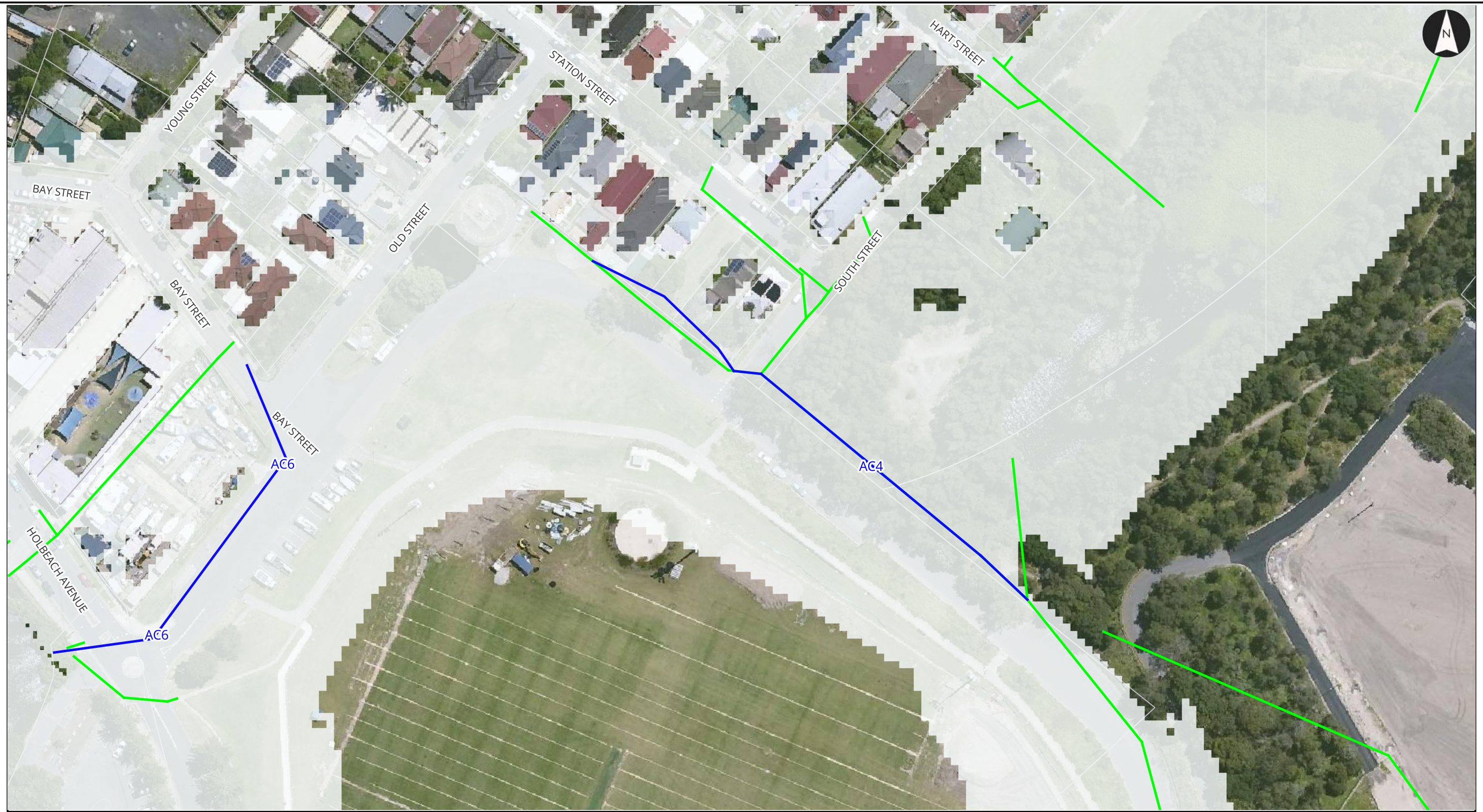
References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option PMF AC4 v6 Station Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 12

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

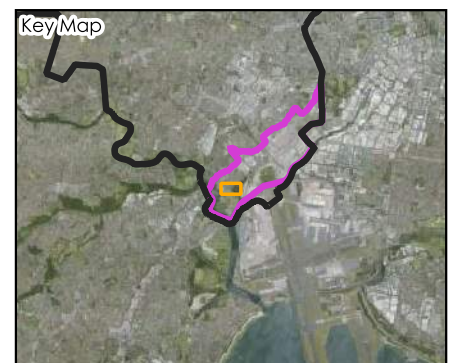
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option - AC6 v5 Overview

Legend

- Proposed Drainage
- Existing Pits and Pipes
- IWC LGA Boundary
- Study Area
- Cadastre

Project: Alexandra Canal FRMS&P
 Client: Inner West Council
 Project Code: 304600163
 Drawn By: AC, Checked By: MG
 Date: (2023-12-22)
 Figure No: 13



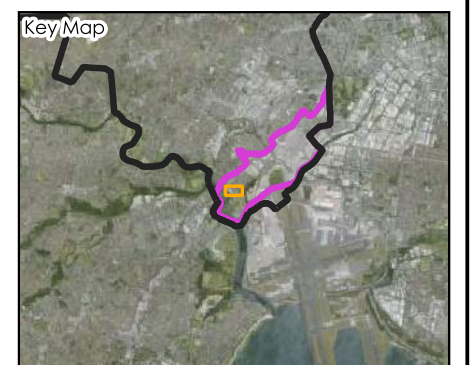
Notes:
 1. Map displayed in EPSG:28356

References:
 1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 20% AEP AC6 v5 Bay Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 14

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
 - Was Wet, Now Dry
 - Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

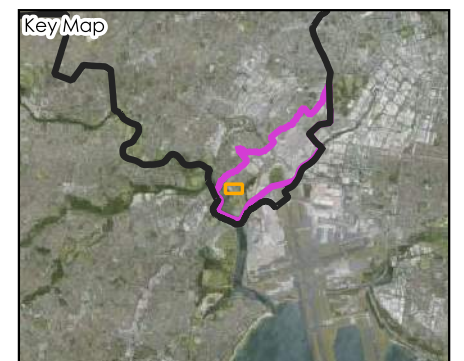
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 5% AEP AC6 v5 Bay Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 15

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

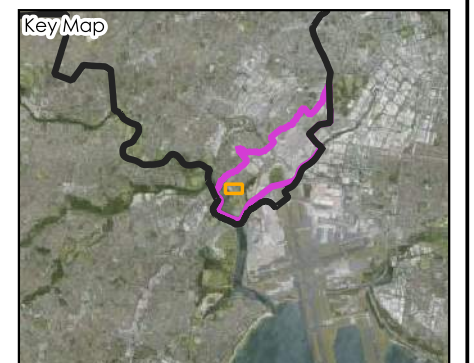
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 2% AEP AC6 v5 Bay Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 16

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
 - Was Wet, Now Dry
 - Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

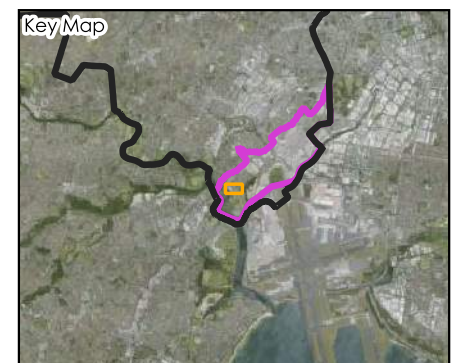
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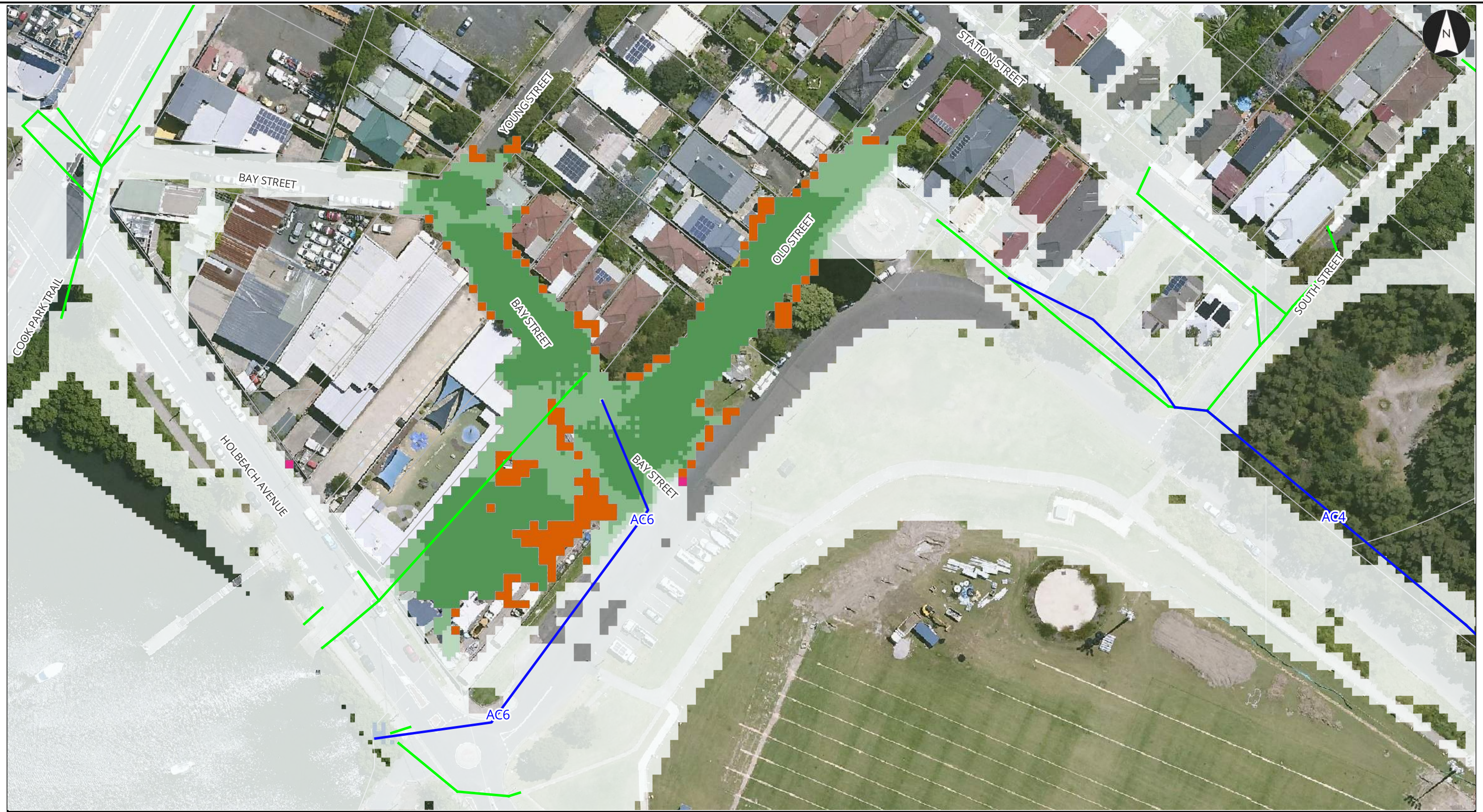
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 1% AEP AC6 v5 Bay Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 17

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

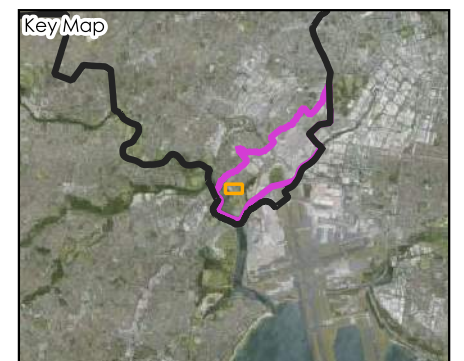
Notes:
1. Map displayed in EPSG:28356

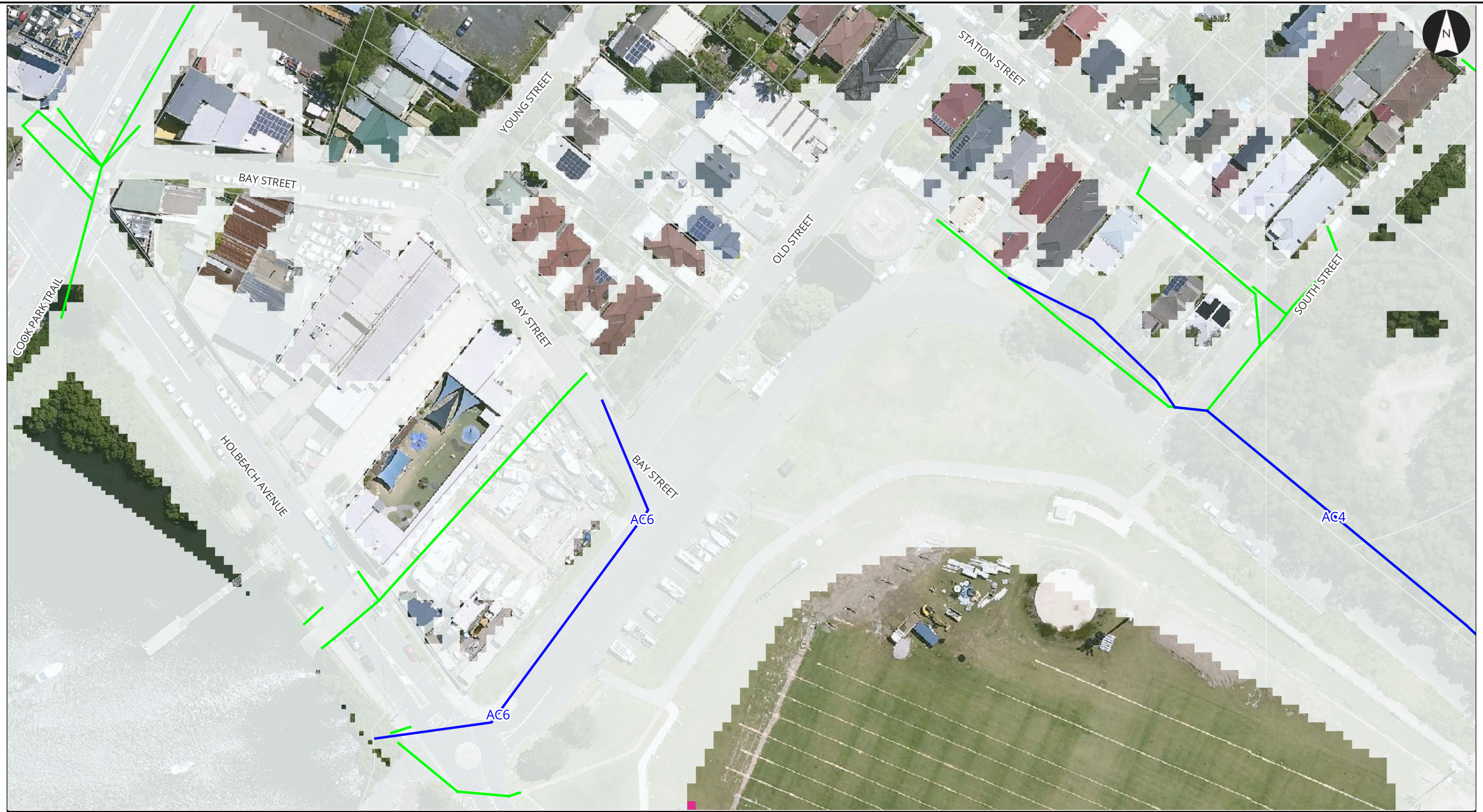
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option PMF AC6 v5 Bay Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 18

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

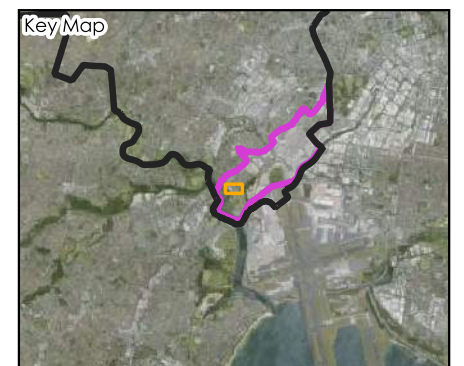
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option - AC11 v3 Overview

Legend

- Proposed Drainage
- Existing Pits and Pipes
- IWC LGA Boundary
- Study Area
- Cadastre

Project: Alexandra Canal FRMS&P

Client: Inner West Council

Project Code: 304600163

Drawn By: AC, Checked By: MG

Date: (2023-12-22)

Figure No: 19



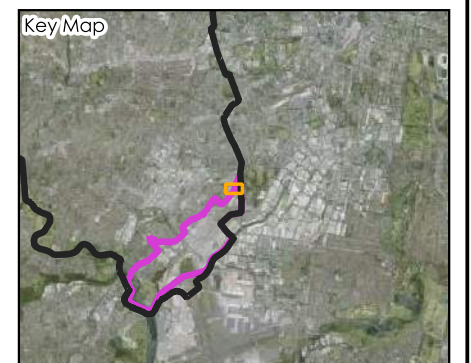
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 20% AEP
AC11 v3 Princes Highway Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 20

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

Notes:
1. Map displayed in EPSG:28356

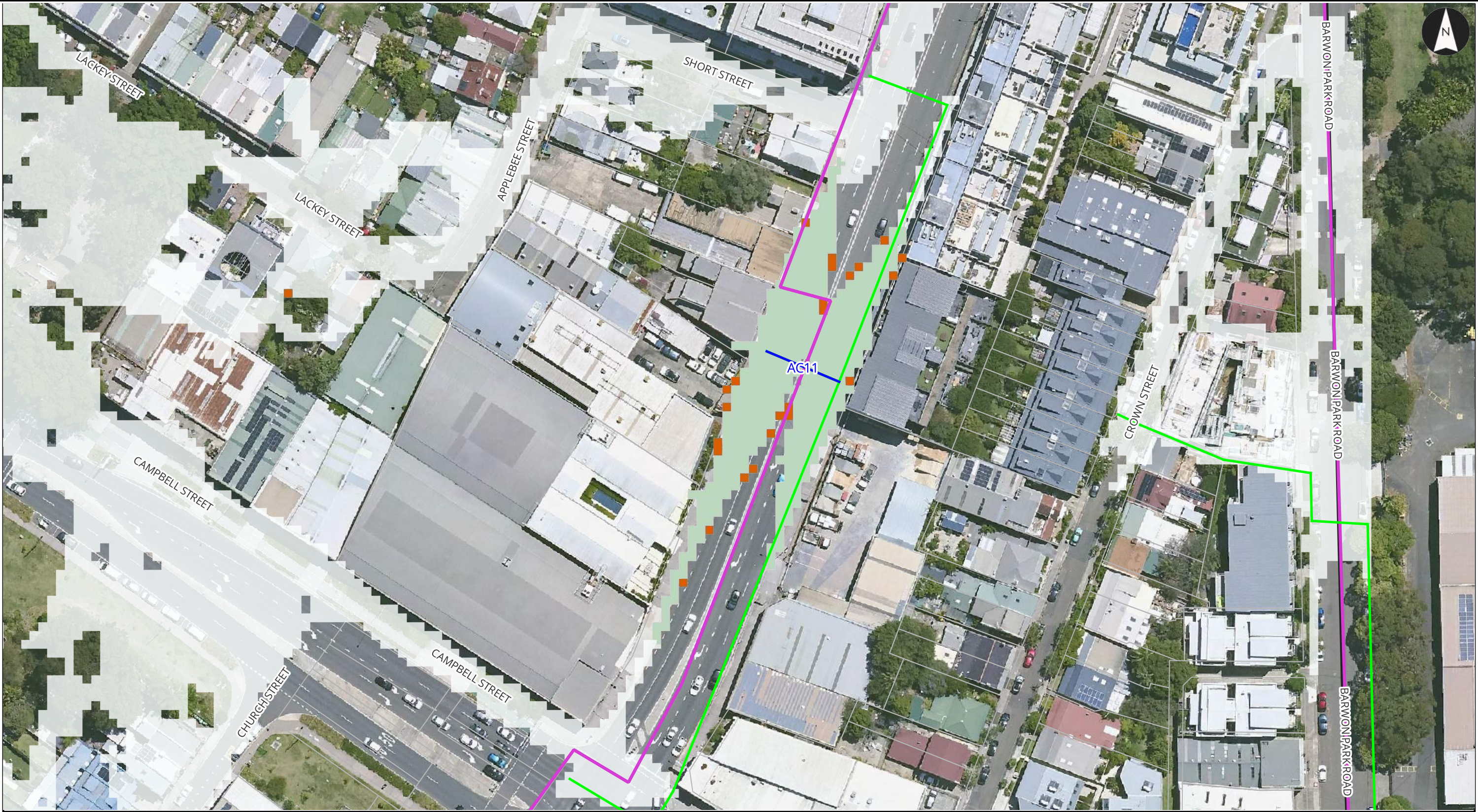
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 5% AEP
AC11 v3 Princes Highway Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 21

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

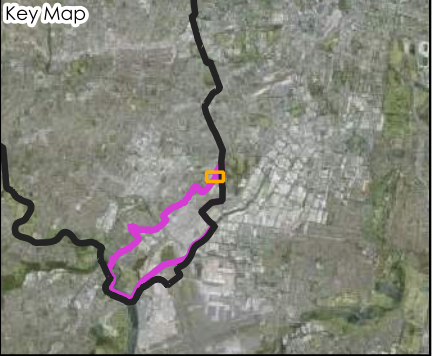
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 2% AEP AC11 v3 Princes Highway Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 22

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

Notes:
1. Map displayed in EPSG:28356

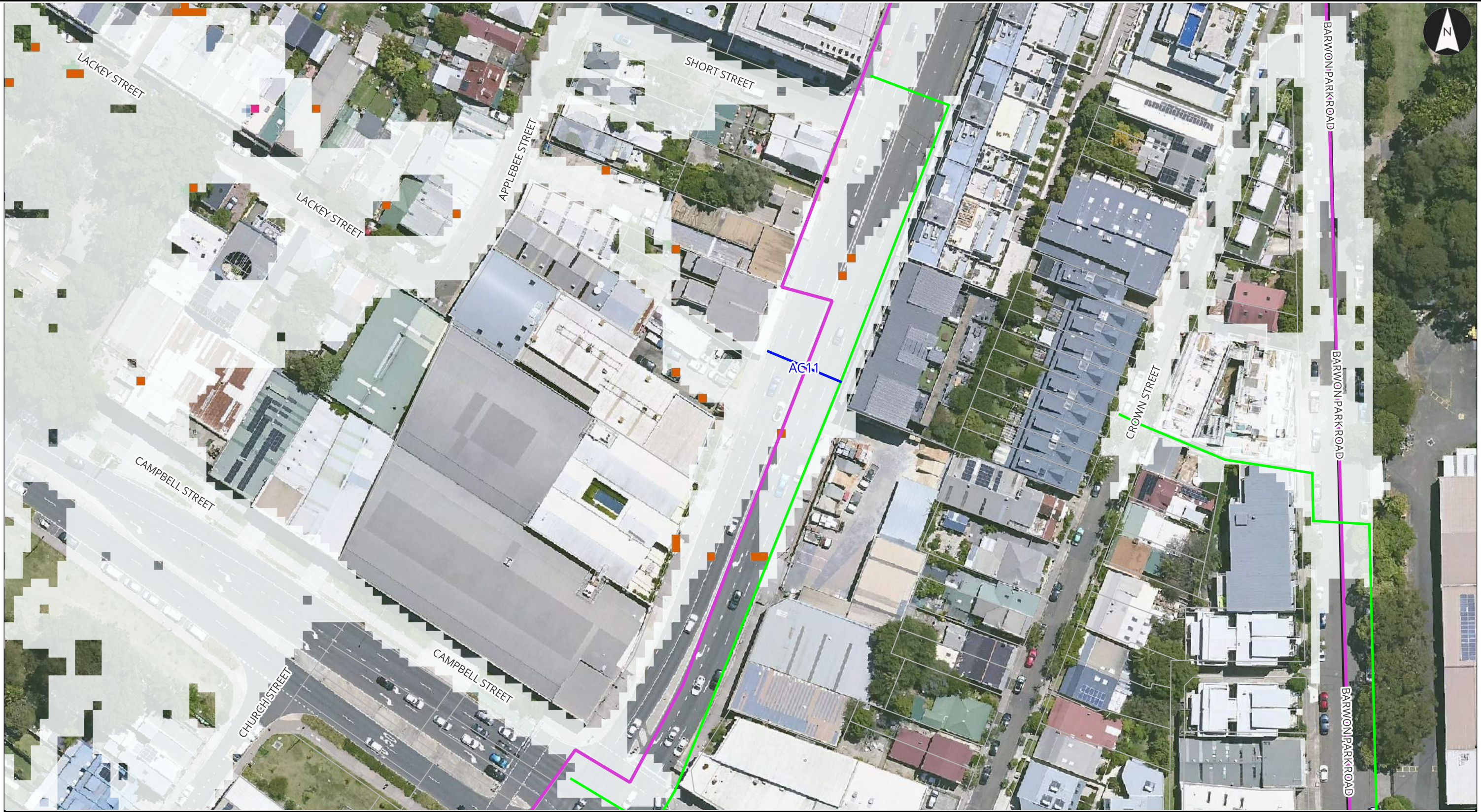
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option 1% AEP
AC11 v3 Princes Highway Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 23



Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

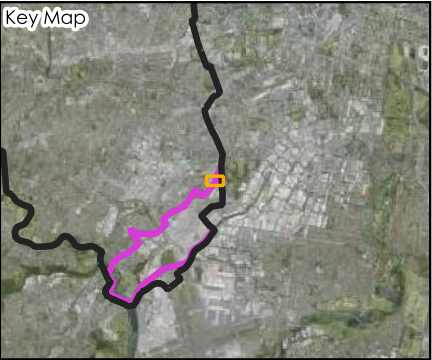
- IWC LGA Boundary
- Study Area
- Cadastre

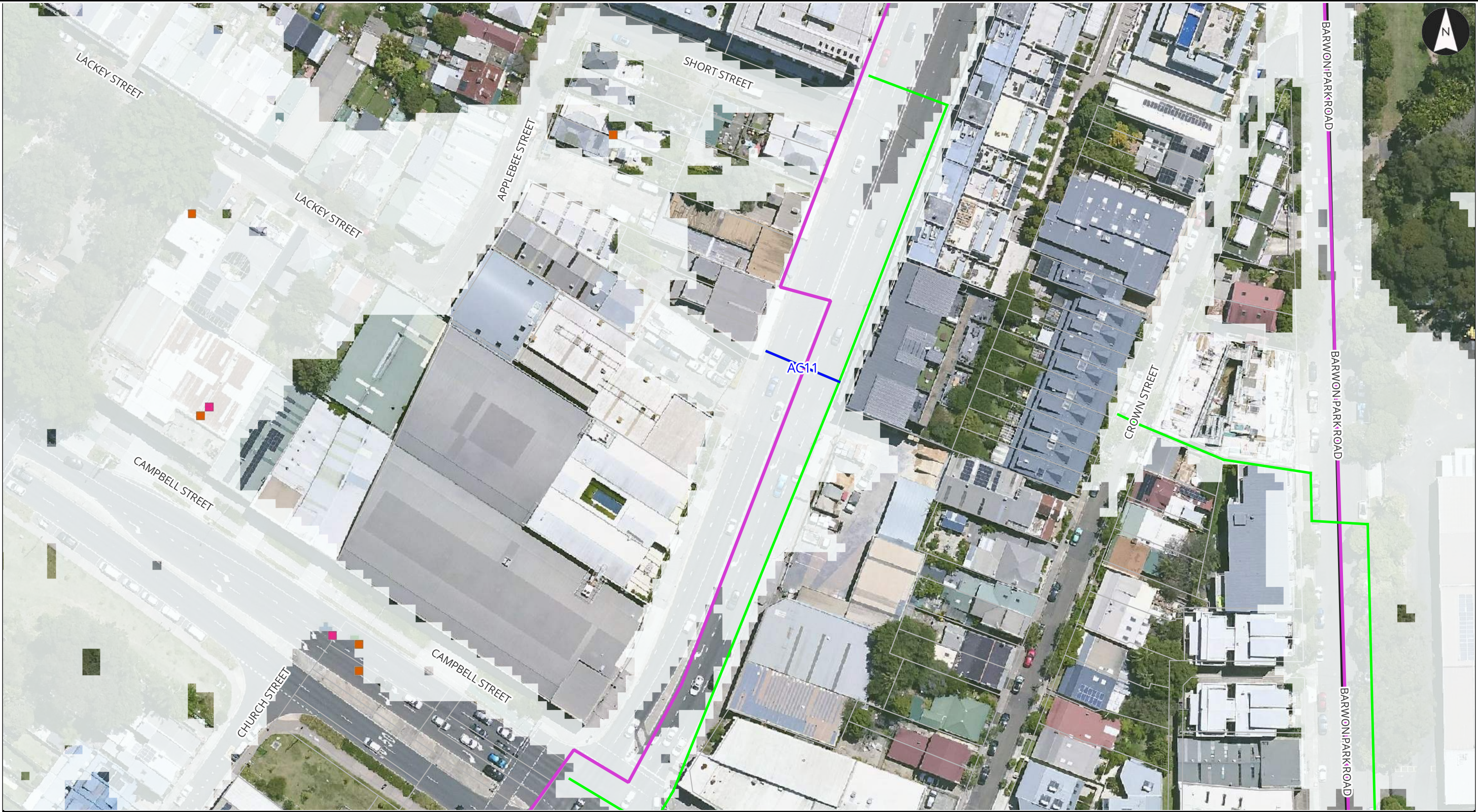
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map



Scale at A3: 1:850





Alexandra Canal Option PMF
AC11 v3 Princes Highway Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 24

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

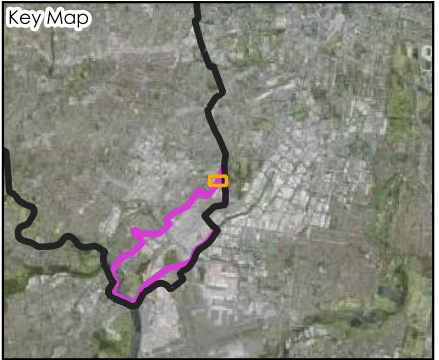
Notes:
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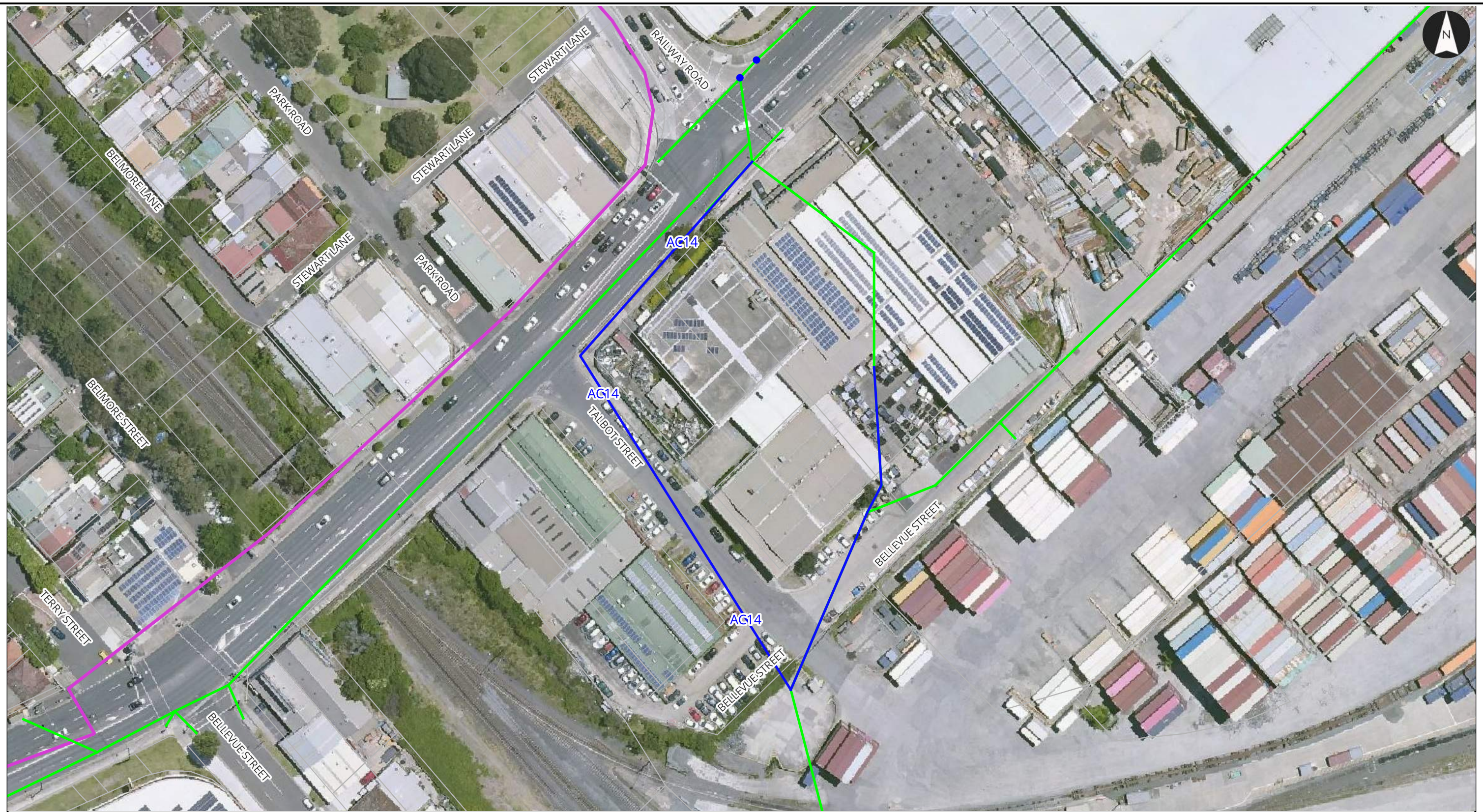
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:850





Alexandra Canal Option - AC14 v6 Overview

Legend

- Proposed Drainage
- Existing Pits and Pipes
- IWC LGA Boundary
- Study Area
- Cadastre

Project: Alexandra Canal FRMS&P

Client: Inner West Council

Project Code: 304600163

Drawn By: AC, Checked By: MG

Date: (2023-12-22)

Figure No: 25

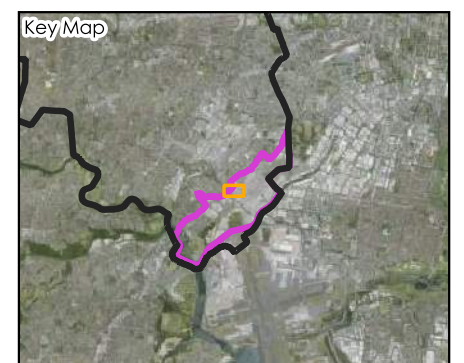


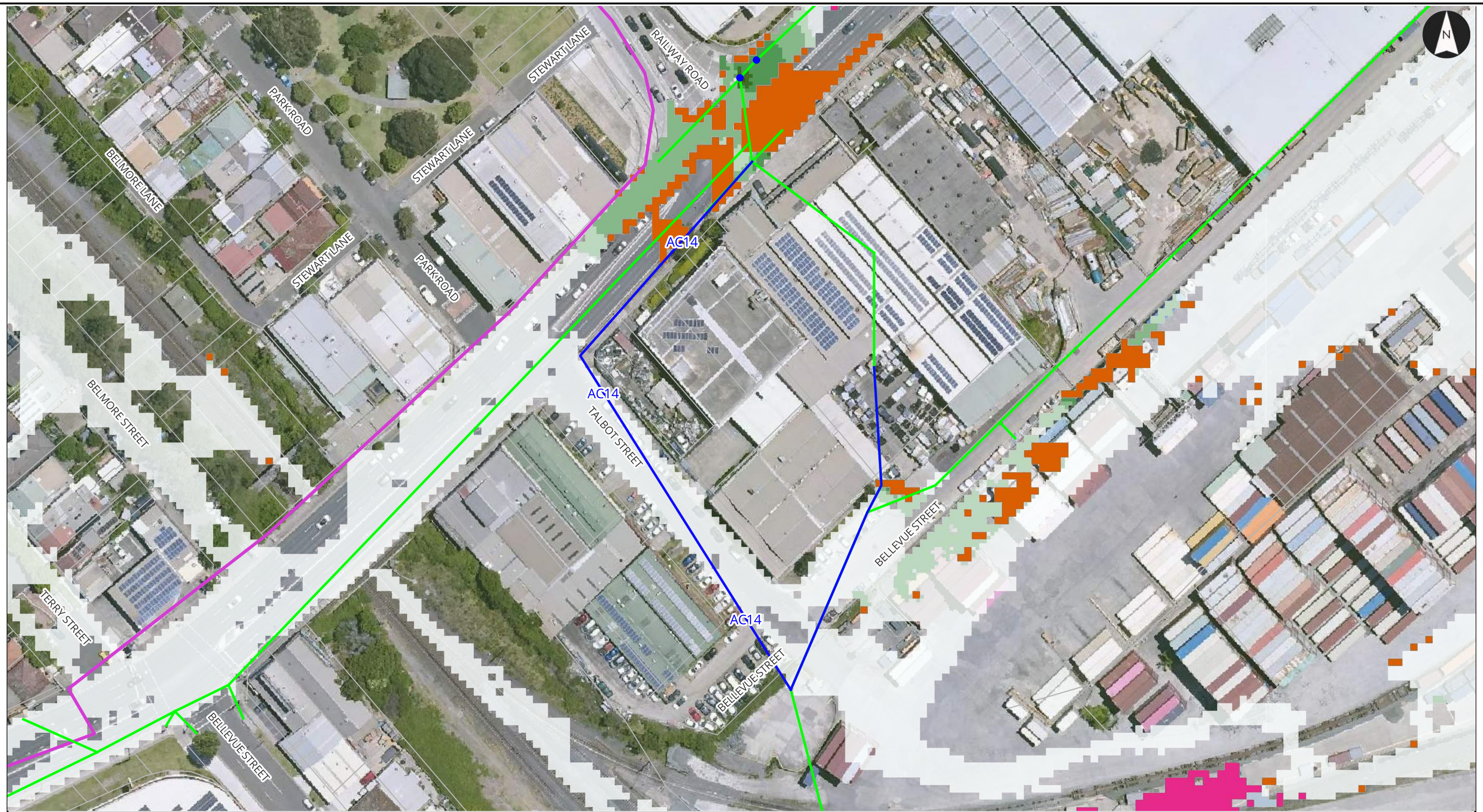
Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction

Scale at A3: 1:1000





Alexandra Canal Option 20% AEP
AC14 v6 Talbot Street Drainage
Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 26

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

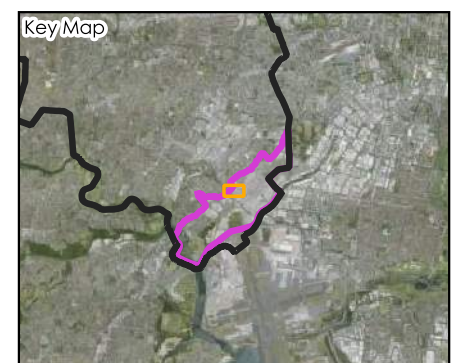
- IWC LGA Boundary
- Study Area
- Cadastre

Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction
10 0 10 20 30 40 m

Scale at A3: 1:1000





Alexandra Canal Option 5% AEP AC14 v6 Talbot Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 27

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

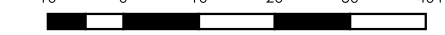
Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

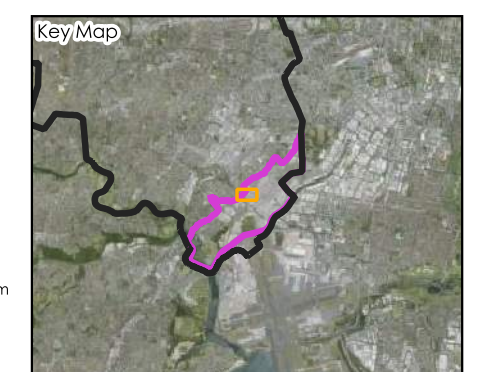
Notes:
1. Map displayed in EPSG:28356

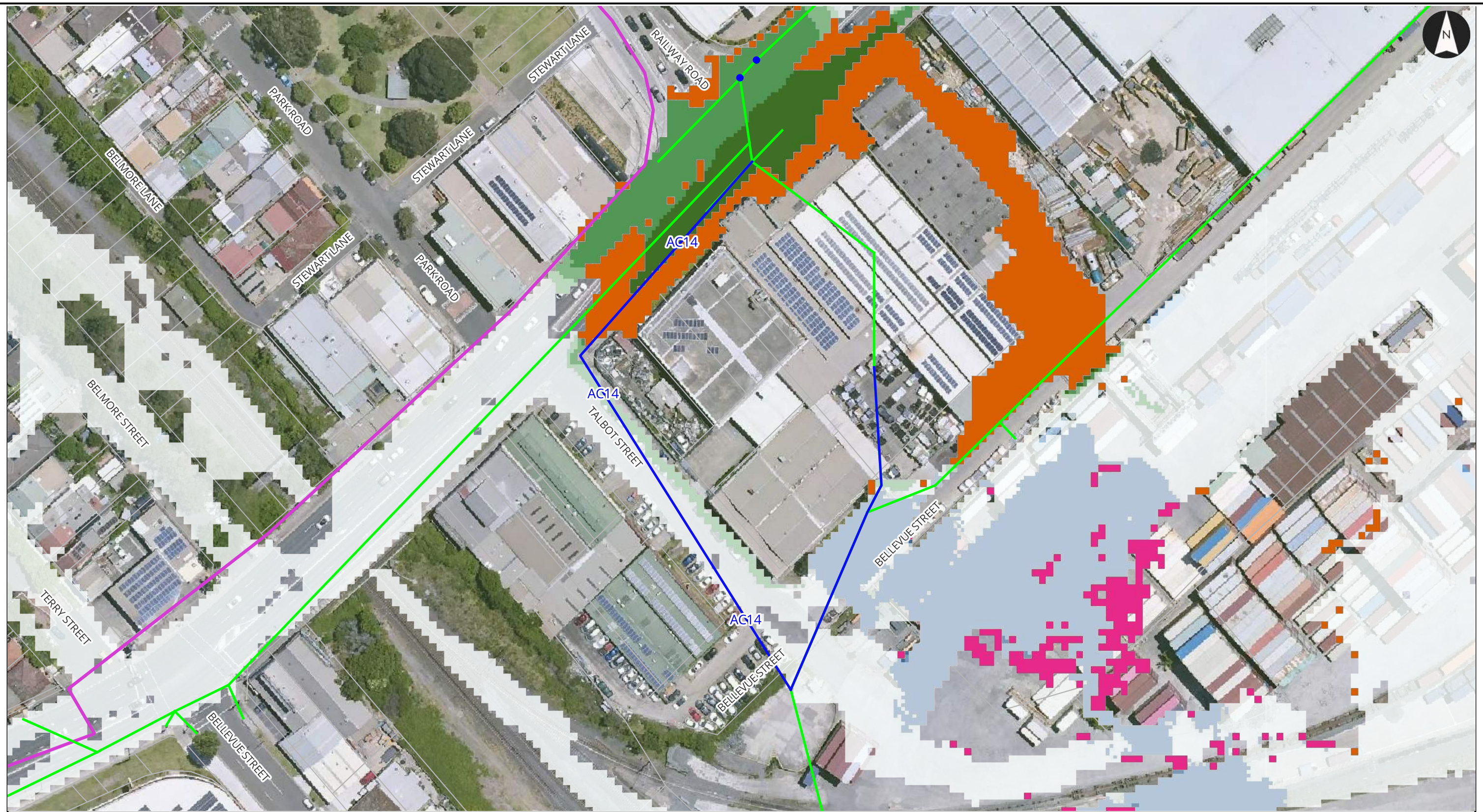
References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option 2% AEP AC14 v6 Talbot Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 28

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

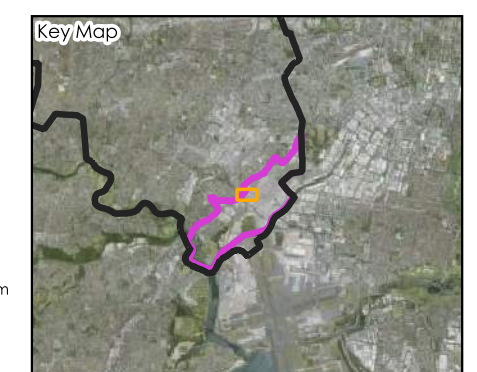
Notes:
1. Map displayed in EPSG:28356

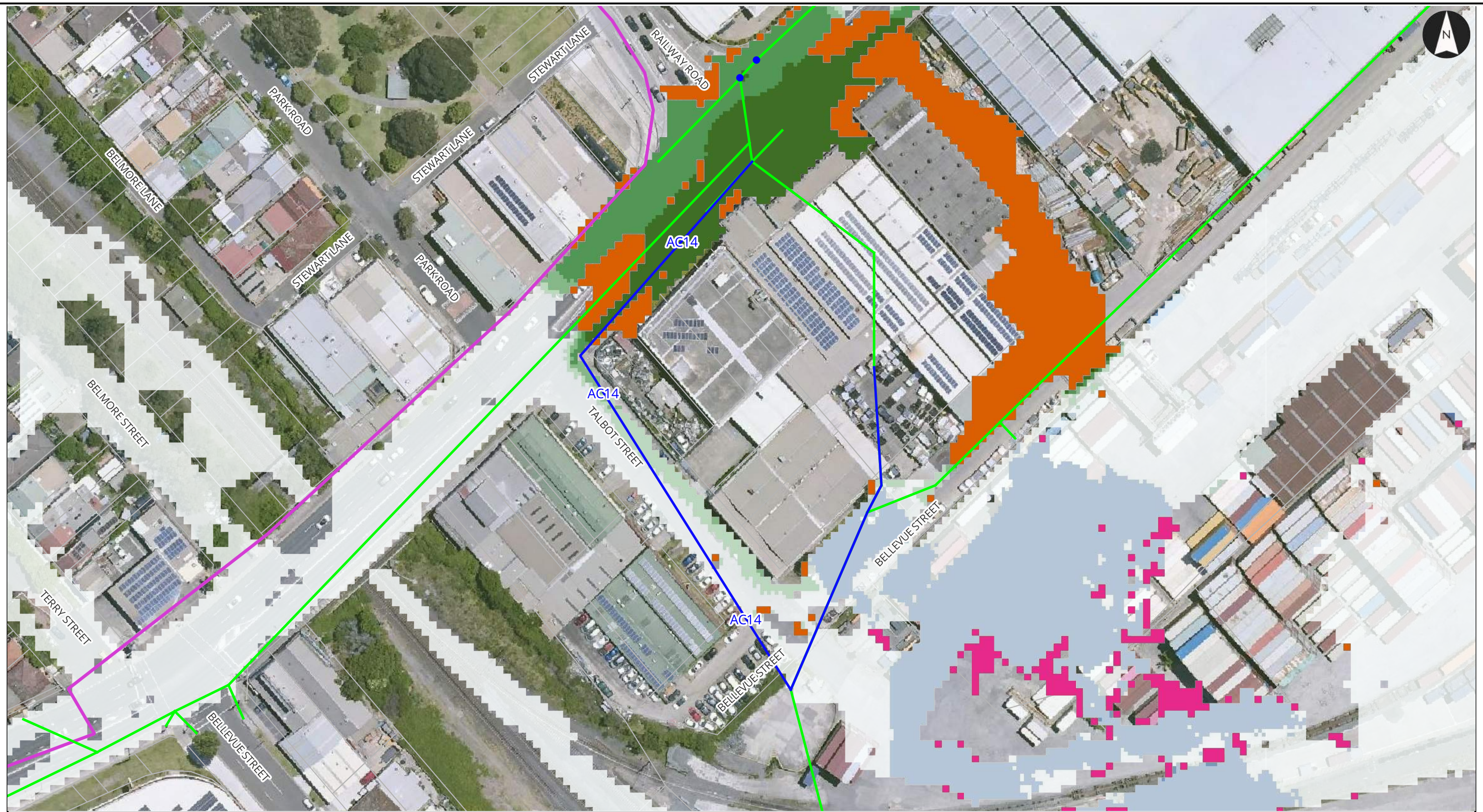
References:
1. Metro map

DRAFT - Not For Construction

10 0 10 20 30 40 m

Scale at A3: 1:1000





Alexandra Canal Option 1% AEP AC14 v6 Talbot Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 29

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

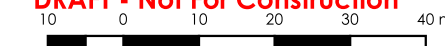
Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

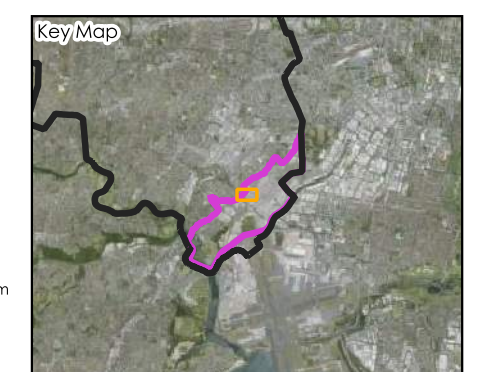
Notes:
1. Map displayed in EPSG:28356

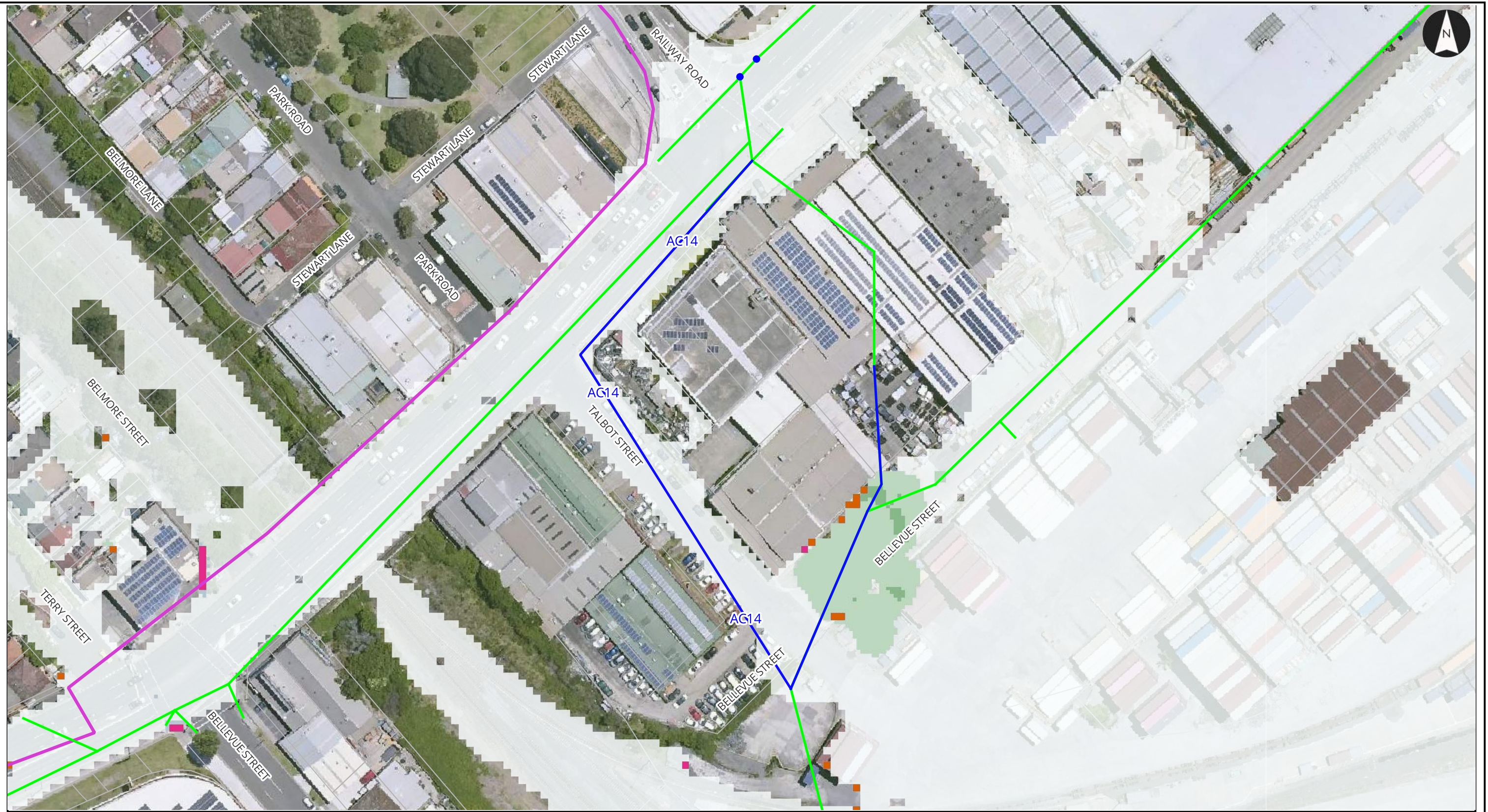
References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000





Alexandra Canal Option PMF AC14 v6 Talbot Street Drainage Upgrade

Project: Alexandra Canal FRMS&P
Client: Inner West Council
Project Code: 304600163
Drawn By: AC, Checked By: MG
Date: (2023-12-22)
Figure No: 30

Legend

- Proposed Drainage
- Existing Pits and Pipes
- Change in Flood Extents (Wet/Dry)
- Was Wet, Now Dry
- Was Dry, Now Wet

Water Level Difference (m)	
< -0.50	
-0.50 to -0.20	
-0.20 to -0.10	
-0.10 to -0.05	
-0.05 to -0.01	
-0.01 to 0.01	
0.01 to 0.05	
0.05 to 0.10	
0.10 to 0.20	
0.20 to 0.50	
> 0.50	

- IWC LGA Boundary
- Study Area
- Cadastre

Notes:
1. Map displayed in EPSG:28356

References:
1. Metro map

DRAFT - Not For Construction



Scale at A3: 1:1000



APPENDIX

F

MCA SCORING AND IMPLEMENTATION

Table - Multi-Criteria Assessment – Scoring System

Category	Criterion	Weighting	Description of Criterion Assessment	Score				
				-2	-1	0	1	2
Economic	Benefit-Cost Ratio	20%	The cost effectiveness of the scheme, i.e. the tangible return on investment	0 to 0.25	0.25 to 0.5	0.5 to 1.5	1.5 to 3.0	>3.0
	Reduction in Risk to Property	5%	Based on reduction in AAD, it establishes the tangible benefit of an option	Major increase in AAD (>\$200,000)	Slight increase in AAD (\$200k to \$100k)	Negligible Improvement (less than \$100k AAD impact)	Slight decrease in AAD (\$200k to \$100k)	Major decrease in AAD (>\$200,000)
	Technical Feasibility	10%	Establishes the feasibility of options based on likely service constraints, environmental hazards, and programming contingencies such as land acquisition or agreements with external agencies	There are a number of significant factors that pose an impact on the feasibility of the project	There is a single significant factor or multiple smaller factors that pose a potential impact on the feasibility of the project	May or may not be feasible	Likely to be feasible with management of constraints	Very likely to be feasible with no significant restraint
	Implementation Complexity	5%	Ease of constructability within Council's standard Capital Works Planning	Construction timeframe greater than 1 year Project can not be broken down into sequential components	Construction timeframe greater than	Key components can be completed in isolation within 12 months	Overall construction timeframe less than 12 months Minor components can be staged	Construction timeframe less than 6 months Major components can be staged
	Adaptability and long-term performance	10%	The impact the option will have both in terms of feasibility, benefits and cost over the life of the option, and adaptability to climate change conditions	Significantly diminished performance long-term or under climate change	Slightly diminished performance long-term or under climate change	Unchanged performance long-term or under climate change	Unchanged or improved performance long-term or under climate change with minor ongoing costs	Unchanged or improved performance long-term or under climate change with negligible ongoing costs
Social	Reduction in Risk to Life	15%	The impact on risk to life from the 20% AEP up to the PMF event	Widespread or significant localised increase in risk to life	Localised or slight increase in risk to life	Negligible change in risk to life	Localised or slight reduction of risk to life	Widespread or significant localised reduction of risk to life
	Emergency Access and Evacuation	10%	The impact on the ability to evacuate or for NSW SES or emergency services under extreme flood conditions	Widespread or significant localised impact on evacuation and emergency services	Localised or slight localised impact on evacuation and emergency services	Negligible impact on evacuation and emergency services	Localised or slight improvement for evacuation and emergency services	Widespread or significant localised improvement for evacuation and emergency services
	Social Disruption and Public Open Spaces	5%	The impact of the risk management option on social disruption and the use of public spaces	Significant increase in the frequency of flooding or limitation of the use of a public space or causes significant social disruption	Increase in the frequency of flooding or limitation of the use of a public space or causes social disruption	Negligible impact on public space or social disruption	Reduces the frequency of flooding or provides enhanced use of a public space or causes social benefit	Significantly reduces the frequency of flooding or enhanced use of a public space or causes significant social benefit
	Community and Stakeholder Support	10%	Support for the option based on FRM Committee meeting, stakeholder engagement and community consultation outcomes	Strong opposition to the option in multiple submissions	Slight opposition to the option	No response	Slight support to the option	Significant support to the option
Environment	Impact on Fauna/Flora	5%	Likely impacts on Threatened Ecological Communities and Threatened Species	High negative impact	Slight negative impact	Negligible impact	Some benefit	Considerable benefit
	Impact on Heritage	5%	Impact to Heritage items	Likely impact on State, National, or Aboriginal Heritage item	Likely impact or increased impact on a local heritage item	No impact	Reduces the impact of flooding to heritage item or heritage conservation area	Heritage item no longer flooded

Table - Multi Criteria Assessment Outcomes – Flood Modification Options - Alexandra Canal

Category	Criterion	Weighting	Description of Criterion Assessment	AC4 - Station St Drainage Upgrade		AC6 - Bay Street Drainage Upgrade		AC11 - Princes Highway Upgrade		AC14 - Talbot St Drainage Upgrade	
				Score	Comment	Score	Comment	Score	Comment	Score	Comment
Economic	Benefit-Cost Ratio	20%	The cost effectiveness of the scheme, i.e. the tangible return on investment	-1	BCR = 0.27	0	BCR = 0.82	0	BCR = 0.08, though damages on west side of Highway not accounted for	0	BCR = 0.88
	Reduction in Risk to Property	5%	Based on reduction in AAD, it establishes the tangible benefit of an option	0	AAD increase <\$100k	0	AAD increase <\$100k	1	AAD increase <\$100k, though damages on west side of Highway not accounted for	1	AAD increase \$100k-200k
	Technical Feasibility	10%	Establishes the feasibility of options based on likely service constraints, environmental hazards, and programming contingencies such as land acquisition or agreements with external agencies	-2	Two utility (Sydney Water and Telstra) services crossing proposed option, works in private properties, potential presence of acid sulfate soils	-1	Two utility (Sydney Water and Telstra) services crossing proposed option, potential presence of acid sulfate soils	-1	Three utility (Sydney Water, Uecomm and Telstra) services crossing proposed option, may be feasible depending on clearance between existing pipes and utilities or possible relocation. Highly constrained major highway corridor.	-1	Two utility (Sydney Water and Telstra) services crossing proposed option in multiple locations, long section of pipe, impacts to property access during works. Along major highway corridor.
	Implementation Complexity	5%	Ease of constructability within Council's standard Capital Works Planning	0	Estimated 12 months, easements in private properties	2	Construction timeframe less than 6 months, basic drainage installation in Council owned road corridor	-1	Construction timeframe greater than 12 months that can be staged - temporary lane closures, nightworks. Works in TfNSW corridor (Princes Highway) so would need to be collaboration with TfNSW	-2	Construction timeframe greater than 12 months that can be staged - temporary lane closures, nightworks. Works in TfNSW corridor (Princes Highway) so would need to be collaboration with TfNSW. Easements in private properties
	Adaptability and long-term performance	10%	The impact the option will have both in terms of feasibility, benefits and cost over the life of the option, and adaptability to climate change conditions	0	Climate change may increase frequency of flooding (considering a lifespan of 30-50 years), though this option will help to reduce that flooding severity	0	Slight impact from climate change (considering a lifespan of 30-50 years). Performance of flap gate and tidal flow will help to address sea level rise impacted by climate change	0	Climate change may increase frequency of flooding (considering a lifespan of 30-50 years), though this option will help to reduce that flooding severity	0	Climate change may increase frequency of flooding (considering a lifespan of 30-50 years), though this option will help to reduce that flooding severity
Social	Reduction in Risk to Life	15%	The impact on risk to life from the 20% AEP up to the PMF event	0	Only H1-H2 in existing conditions, minimal reduction in water level in local road corridor only	1	H3 in existing conditions, minimal reduction in water level in road corridor only	1	Only H1-H2 in existing conditions, minimal reduction in water level. Option is on Princes Highway (major evacuation route) in road corridor only	1	Minimal areas of H3 in existing conditions, minimal reduction in water level. Option is on Princes Highway (major evacuation route) in road corridor only
	Emergency Access and Evacuation	10%	The impact on the ability to evacuate or for NSW SES or emergency services under extreme flood conditions	0	Minimal reduction in water level in road corridor (very localised)	2	Some reduction in water level in local road corridor (very localised). Depth of approx 0.8m in the existing 1% event. Will assist with reduced flooding frequency	2	Minimal reduction in water level. Option is very localised on Princes Highway (major evacuation route) in road corridor	2	Some reduction in water level. Option is very localised on Princes Highway (major evacuation route) in road corridor
	Social Disruption and Public Open Spaces	5.0%	The impact of the risk management option on social disruption and the use of public spaces	1	Reduced flooding of sports fields and minor reduced flooding of local roads	2	Reduced nuisance flooding in road corridor	0	Reduced flooding on Princes Highway, social disruption due to roadworks on Princes Highway	0	Reduced flooding on Princes Highway, social disruption due to roadworks on Princes Highway
	Community and Stakeholder Support	10%	Support for the option based on FRM Committee meeting, stakeholder engagement and community consultation outcomes	0	No response from the community in relation to this option. Community member noted this trunk drainage line had collapsed years ago resulting in flooding, but did not request drainage capacity increase.	2	During community consultation, suggestions for a proposed option to address Bay St flooding was received. SES indicated awareness of community complaints regarding flooding in this area	2	SES shared strong support for making the regional evacuation route (Princes Highway) flood free due to SES site located nearby	2	SES shared strong support for making the regional evacuation route (Princes Highway) flood free due to SES site located nearby
Environment	Impact on Fauna/Flora	5%	Likely impacts on Threatened Ecological Communities and Threatened Species	-1	Potential slight negative impacts (temporary) to nearby trees and wetland environment due to drainage works	-1	Negligible known impacts on fauna and flora. New pipe outlet may need to be designed to avoid existing estuarine vegetation	0	Negligible known impacts on fauna and flora	0	Negligible known impacts on fauna and flora
	Impact on Heritage	5%	Impact to Heritage items	0	No known impact to heritage items	0	No known impact to heritage items	0	No known impact to heritage items	0	No known impact to heritage items
Total Score (from -22 to 22)				-3		7		4		3	
Total Weighted Score (from -2.00 to 2.00)				-0.40		0.60		0.45		0.40	

Table - Multi Criteria Assessment Outcomes – Property Modification and Emergency Management Options - All Sub-Catchments

Category	Criterion	Weighting	Description of Criterion Assessment	Property Modification (PM) Options		Emergency Management (EM) Options							
				PM6 - Stormwater System Maintenance		EM2 - Review of Local Flood Planning and Info to SES		EM3 - Community Flood Awareness		EM5 - Flood Markers and Signage		EM6 - Flood Data and Debrief	
				Score	Comment	Score	Comment	Score	Comment	Score	Comment	Score	Comment
Economic	Benefit-Cost Ratio	20%	The cost effectiveness of the scheme, i.e. the tangible return on investment	1	BCR = 2.36, though the efficacy of maintenance is dependent on timing, it is difficult to guarantee these benefits	0	BCR = 1.0	0	BCR = 1.0	0	BCR = 1.0	0	BCR = 1.0
	Reduction in Risk to Property	5%	Based on reduction in AAD, it establishes the tangible benefit of an option	1	AAD increase >\$200k, though the efficacy of maintenance is dependent on timing, it is difficult to guarantee these benefits	0	Unknown impacts on flood damages, conservatively assumed to be negligible	0	Unknown impacts on flood damages, conservatively assumed to be negligible	0	Unknown impacts on flood damages, conservatively assumed to be negligible	0	Unknown impacts on flood damages, conservatively assumed to be negligible
	Technical Feasibility	10%	Establishes the feasibility of options based on likely service constraints, environmental hazards, and programming contingencies such as land acquisition or agreements with external agencies	2	Council would already have a maintenance schedule in place and can consider increasing frequency. However, should be noted that effectiveness of the maintenance schedule of stormwater system is dependent on timing of a rainfall event and may or may not have a significant impact	2	Straightforward to implement a local flood planning review and allow for sharing of information with NSW SES	1	Depending on the awareness program to be developed, could be some complications with regards to encouraging community engagement with such a program	2	Straightforward to implement and install flood markers and signage	1	Council should already have a flood data collection scheme. Would need to ensure the availability of Council staff to respond to and record flooding at any time
	Implementation Complexity	5%	Ease of constructability within Council's standard Capital Works Planning	2	Straightforward to increase maintenance schedule	2	Straightforward to implement a local flood planning review and allow for sharing of information with NSW SES	1	Depending on the awareness program to be developed, could be some complications with regards to encouraging community engagement with such a program	2	Straightforward to implement and install flood markers and signage	1	Council should already have a flood data collection scheme. Would need to ensure the availability of Council staff to respond to and record flooding at any time
	Adaptability and long-term performance	10%	The impact the option will have both in terms of feasibility, benefits and cost over the life of the option, and adaptability to climate change conditions	0	No impact of adaptability of maintenance to climate change conditions	2	Minimal ongoing costs for review. Review can be revised to consider climate change impacts in the future	1	Ongoing costs to maintain the flood awareness program, however following initial engagement ongoing information should be more straightforward. Can be	2	Minimal ongoing costs for flood markers and signage. Signs can be altered to account for climate change if necessary, however unlikely to be needed	2	Ongoing costs will be variable based on flood event occurrence. Climate change should not significantly influence scheme
Social	Reduction in Risk to Life	15%	The impact on risk to life from the 20% AEP up to the PMF event	1	Increased frequency of stormwater system management may or may not have an effect depending on timing of a rainfall event. Slight benefits if a rainfall event occurs right after scheduled maintenance	2	Providing information to SES will assist them in their planning and consequently reduce risk to life	2	Expected reduction in risk to life through better responses of majority of residents	1	Expected reduction in risk to life through residents not attempting to enter floodwaters	0	Negligible direct impact on risk to life
	Emergency Access and Evacuation	10.0%	The impact on the ability to evacuate or for NSW SES or emergency services under extreme flood conditions	1	Increased frequency of stormwater system management may or may not have an effect depending on timing of a rainfall event. Slight benefits if a rainfall event occurs right after scheduled maintenance	2	Providing information to SES will assist them in their planning	2	A flood aware community will limit the number of instances of residents entering floodwaters	2	Will assist residents and the NSW SES identify depth of flooding for some crossings on evacuation routes	0	Negligible direct impact on emergency access and evacuation
	Social Disruption and Public Open Spaces	5.0%	The impact of the risk management option on social disruption and the use of public spaces	0	Near negligible social disruption of residences with more frequent maintenance, no impact on open space or increase in flooding	0	No direct impact on social disruption or public open space	2	Improved community awareness seen as a social benefit	0	No direct impact on social disruption or public open space	0	No direct impact on social disruption or public open space
	Community and Stakeholder Support	10%	Support for the option based on FRM Committee meeting, stakeholder engagement and community consultation outcomes	1	Two responses received during community consultation requesting more frequent stormwater maintenance. Supported by Council engineers	1	NSW SES confirmed support for continued data provision in light of Flood Plan development	1	NSW SES supports the development of a Council led flood awareness program	1	NSW SES supports the development of this measure. Would require TNSW agreement for signage on major TNSW roads	1	NSW SES supports continued flood debrief and recording of information
Environment	Impact on Fauna/Flora	5%	Likely impacts on Threatened Ecological Communities and Threatened Species	0	Negligible impact	0	Negligible impact	0	Negligible impact	0	Negligible impact	0	Negligible impact
	Impact on Heritage	5%	Impact to Heritage items	0	Negligible impact	0	Negligible impact	0	Negligible impact	0	Negligible impact	0	Negligible impact
Total Score (from -22 to 22)				9		11		10		10		5	
Total Weighted Score (from -2.00 to 2.00)				0.90		1.10		0.95		0.95		0.45	

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