STORMWATER SYSTEM MANAGEMENT PLAN

DECEMBER 2019

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1 Executive Summary

The *Urban Drainage Act 2013* (the Act) requires that all Tasmanian Councils develop a Stormwater System Management Plan (SSMP) for the urban areas within their municipalities. A well-developed SSMP will ensure an appropriate level of understanding and management of the flood risk within all urban drainage catchments.

A SSMP is required to include:

- plans for the management of any assets used for the delivery of a stormwater service; and
- the level of risk from flooding for each urban stormwater catchment in the public stormwater system; and
- any other matters prescribed in the regulations or that the council considers appropriate.

A SSMP can also be used as the basis for developing and prioritising capital works and informing asset management plans.

Council's urban area is divided into 75 stormwater catchments, which each discharge through a single outlet into either Bass Strait, the Mersey River or other natural water courses.

Council has three works systems:

- Capital
- Operational
- Major Maintenance

in which work programs are delivered to manage Council's stormwater assets.

A multi-year project to accurately survey stormwater assets, create hydraulic models and assess the risk from flooding to people and property has been undertaken and the risk ratings are shown in Table 1 below.

Risk Rating	Total Catchments	% Total
High	4	5%
High-Medium	0	0%
Medium-High	1	1%
Medium	9	12%
Low-Medium	45	60%
Low	0	0%
Not Classified (TBC)	16	21%
TOTAL	**75**	

Table 1 – Summary of risk ratings

The catchments where a high risk from flooding to people or property are large urban catchments:

- Chinamans Creek
- Parker
- Ronald
- William

The risk rating of the stormwater catchments is displayed in map form in Figure 1 below.

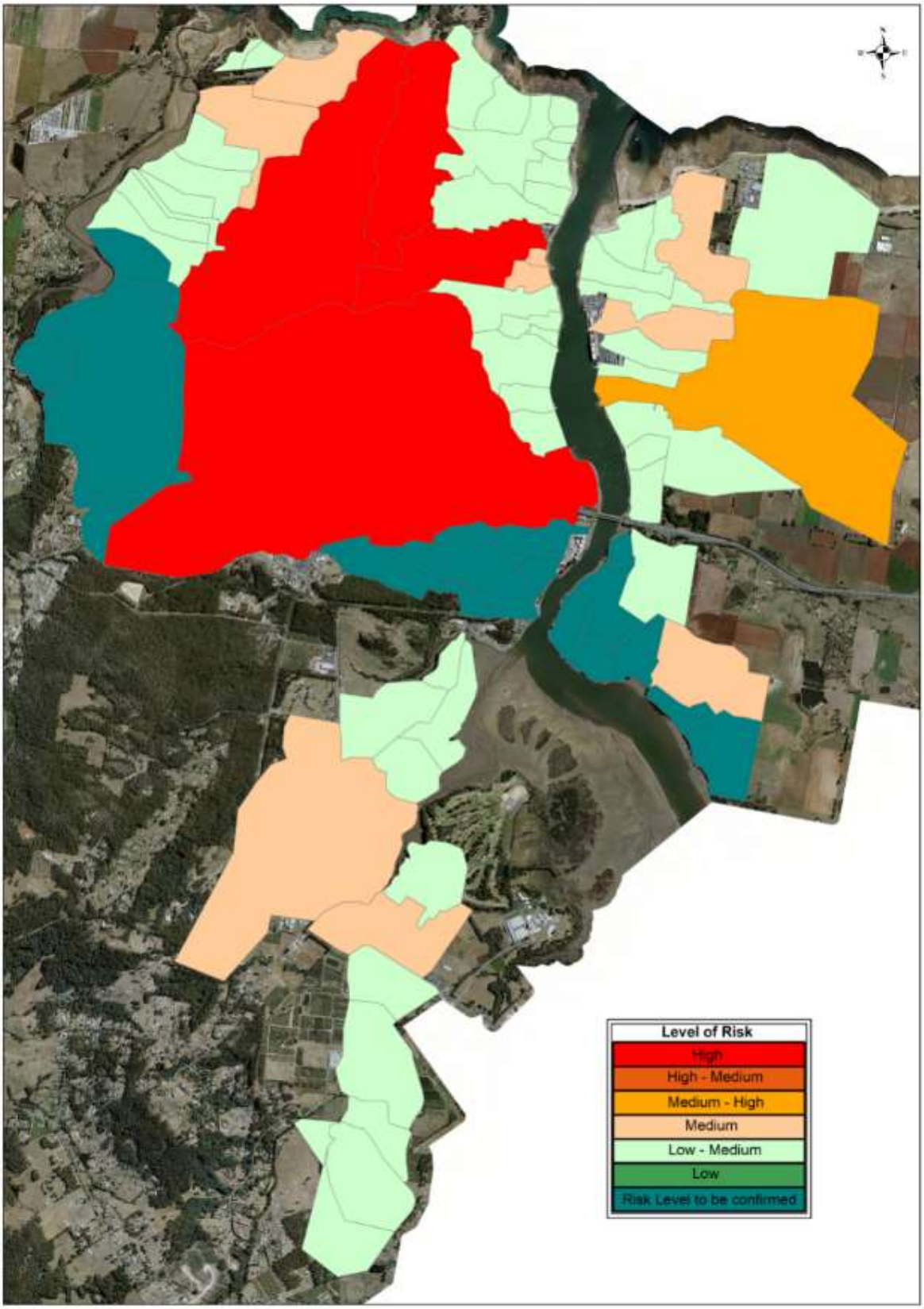


Figure 1 – Stormwater catchment map with risk rating

The action plan for the SSMP includes key activities including:

- Completion of risk assessment for 16 catchments in 2020-21
- Reprioritise capital works program based on risk assessments
- Maintain SSMP
- Maintain link SSMP to asset management plan

2 Introduction:

The *Urban Drainage Act 2013* (the Act) requires that all Tasmanian Councils develop a Stormwater System Management Plan (SSMP) for the urban areas within their municipalities.

A well-developed SSMP will ensure an appropriate level of understanding and management of the flood risk within all urban drainage catchments. The data presented in a SSMP is critical to ensure that Council's finite capital works program allocations for stormwater projects are directed to the most appropriate projects, reducing the risk from flooding to people and property. A SSMP compliments Council's Stormwater Strategy and Stormwater asset management plan (both under review).

2.1 Urban drainage area

The urban drainage area is shown in Figure 2 below. Generally, the area includes properties that have the opportunity to connect to the piped stormwater system.

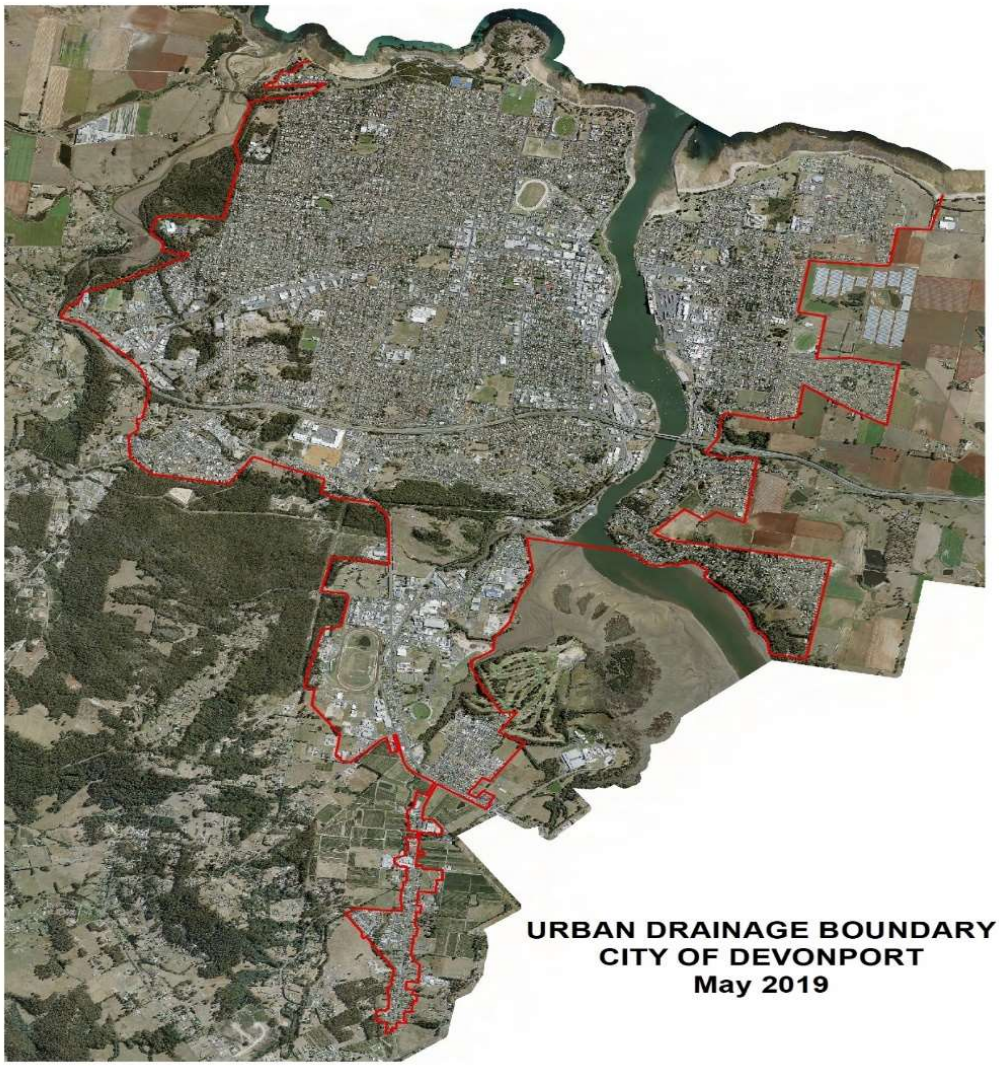


Figure 2 - Urban drainage area

2.2 Urban drainage catchments

Council's urban area is divided into 75 stormwater catchments, which each discharge through a single outlet into either Bass Strait, the Mersey River or other natural water courses. These catchments are shown in Figure 3 below.

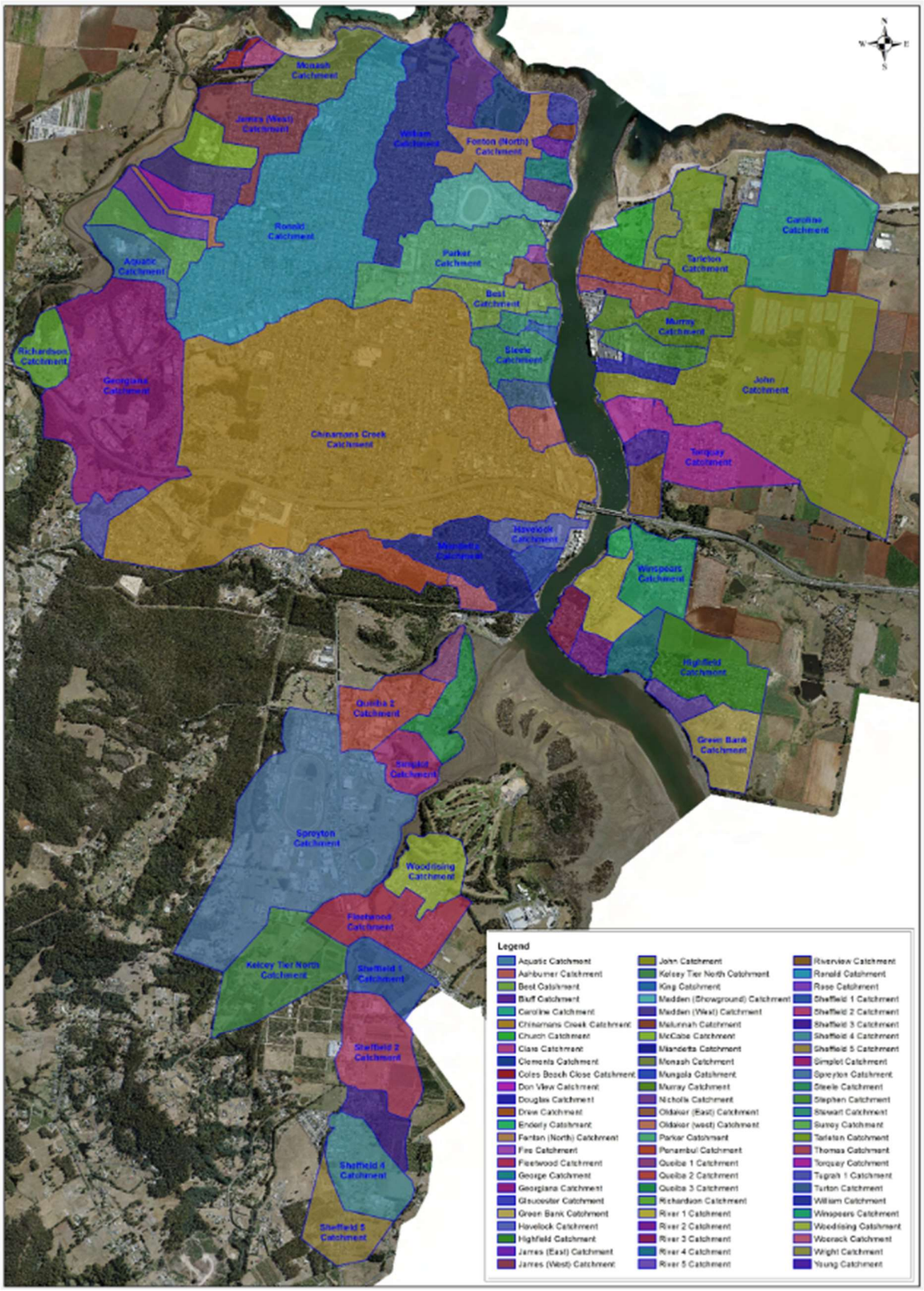


Figure 3 – Stormwater catchment map

3 Strategic and Legislative Context:

3.1 Urban Drainage Act 2013

Section 10 of the Act outlines the requirements to develop a plan and details the requirements of that plan

10. Stormwater system management plans

(1) A council must develop a stormwater system management plan for the urban area of its municipal area within 6 years after the day on which this Act commences.

(2) A stormwater system management plan is to specify –

(a) plans for the management of any assets used for the delivery of a stormwater service; and

(b) the level of risk from flooding for each urban stormwater catchment in the public stormwater system; and

(c) any other matters prescribed in the regulations or that the council considers appropriate.

3.2 Stormwater Strategy

Council's Stormwater Strategy was adopted in 2012. Since then significant changes have occurred that impact the way stormwater systems are managed. Notably:

- Introduction of the Urban Drainage Act 2013, which changed the rights and responsibilities of Council and the community;
- Updates to Australian Rainfall and Runoff in 2016 and 2019, which has updated the way rainfall is modelled. The updated guide requires that storm intensity increases of 14-47% be allowed for when compared with the 1987 guide. This is reflective of the better availability of weather and climate data but also the impacts of climate change already being felt. Furthermore, allowing for future impacts of climate change requires that storm intensity increases of 31-69% be allowed for.

Subsequently a review of Council's Strategy is underway. The Stormwater strategy will provide Council a clear direction for managing the stormwater system within the City of Devonport. The Strategy will reflect the Council's statutory responsibilities as well as the historic, physical, climatic, community, environmental and economic factors that determine the drainage needs, expectations and priorities of the Council and its stakeholders. The review is scheduled to be complete in early 2020.

4 Management of stormwater assets

Council has three work systems to manage and maintain of stormwater assets. The three categories are Capital work, Major maintenance and operational. Capital works are derived through Council stormwater asset management plan and Capital works program. Major maintenance is work that is not required on a regular basis and cannot reasonably be undertaken within the operational budget. Operational work is day to day works that is to be completed in accordance with Services level documents.

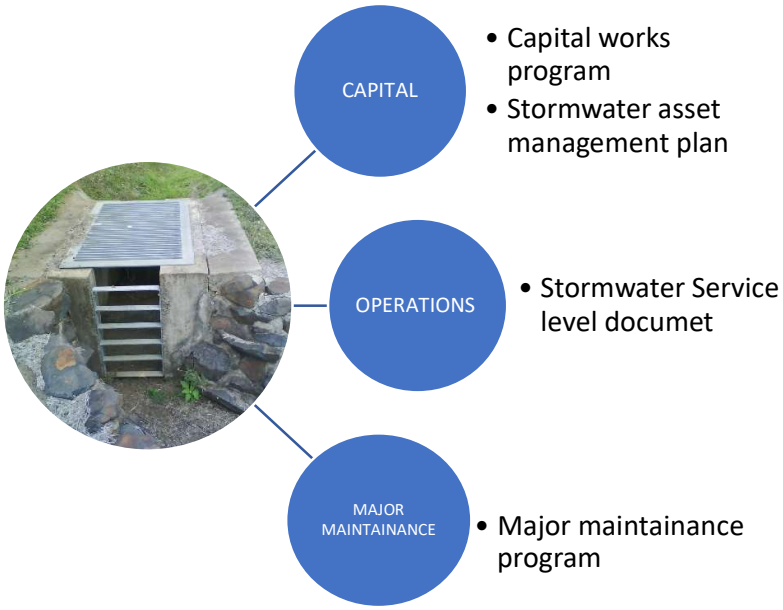


Figure 4 – Council stormwater management

4.1 Asset management plan

The Stormwater asset management plan details information about Stormwater infrastructure assets including actions required to provide an agreed level of service in the most cost-effective manner while outlining associated risks. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services over a 10-year planning period. The Stormwater asset management plan will look at Council stormwater operational and capital expenditure and other various asset renewal factors and provide Council with recommendations on best practices for asset management. The draft stormwater asset management plan is aiming to finalise mid-2020.

4.2 Capital Works Program

Capital works involve the renewal of assets and the creation of new assets. Council has a 5 year forward capital works program which informs a long term financial plan. Prioritisation of capital works considers asset condition, capacity and function. The risk of flooding outlined in the SSMP is a key consideration in prioritising capital works projects.

The current forward works program allocates $4.815M over next 5 years averaging $963,000 annually to undertake work on stormwater catchment risk reduction projects. These allocations are based on previous estimates and priorities understood at the time. How this allocation is directed to specific projects will need to be reassessed based on this SSMP.

4.3 Maintenance Service Levels

Council service levels document how stormwater infrastructure is to be maintained at an acceptable and affordable level. Council must also comply with relevant

industry standards and guidelines to ensure its Statutory and Risk Management obligations are met. This service level document encompasses the community's expectations within an economic framework based on meeting "reasonable" maintenance operation targets and asset management programs relative to the stormwater system functions. Activities in the service level document include:

i. Strategic and statutory objectives;
ii. Collection collate and process asset condition information;
iii. Monitor operational and environmental performance;
iv. Develop work practices and protocols to achieve the aims of the Service Level Document; and
v. Periodic reviews of practises and implementation of continuous improvement initiatives;

5 Risk Assessment Methodology:

Council has developed a methodology to document the risk to people and property from flooding in each urban catchment.

There are no guidelines that support Councils in the development of a SSMP, so it likely that Council's methodology will differ from other jurisdictions. However, the methodology is based on sound engineering and risk management processes and is described below.

5.1 Updating stormwater asset data

The first phase of assessing the risk to people and property from flooding is to ensure that the stormwater assets being modelled accurately represent the assets that combine to make up the stormwater system. An extensive survey of each catchment has been undertaken to confirm the location and physical attributes of each asset. This process has identified many 'found' assets and greatly improved the accuracy of Council's stormwater asset data, which improves the accuracy of the Assets Management Plan, which flow onto other key documents for Council.

5.2 Hydraulic modelling

Accurate spatial and attribute data is required to create a realistic hydraulic model that can predict the impact of rain events of any severity.

"DRAINS" software package has been used for modelling the hydraulic capacity of each stormwater network in Devonport. Various consultants and in-house resources have been utilised to create hydraulic models. These models are then verified against field observations and historical reports to ensure an acceptable level of accuracy.

This model is used to determine the capacity of the existing piped system. Although this is not required for the risk assessment, it does show how the catchment of the capacity compares against the requirement of Council's Stormwater Strategy, which are:

- 10% AEP for residential areas
- 5% AEP for commercial and industrial areas

Details of the hydraulic models inform the risk assessments. The models can also be to identify and compare upgrade options that would reduce the risk from flooding.

5.3 Risk Assessment Procedure

A risk assessment was undertaken for each stormwater catchment which has had a hydraulic model developed. To determine the risk from flooding for each catchment, the two criteria below were used:

- Risk to life, based on unsafe overland flow throughout the entire catchment & private property.
- Risk to property, based on the number of properties that will experience overland flow and the estimated cost of repairs

A minimum freeboard of 300mm is recommended for new dwellings as per DCC Stormwater Strategy 2012. However, this minimum freeboard likely doesn't exist for existing developed properties. It is assumed that a minimum freeboard of 150mm would be more acceptable.

There are no definitive costs that exist for flood damage. A simplified approach has been taken for the assessment of risk to property damage as shown in table 1. Properties with overland flows with a depth of less than 150mm are applied the cost to clean up and repair at $4,000 per property. Overland flow depths through private properties greater than 150mm are applied with the cost of external damage and clean up and repair costs at $11,000 per property.

Depth (m)	Cost per property
< 0.15	$4,000
> 0.15	$11,000

Table 2 – Overland flow depth costs per property

The risk assessment equates the likelihood of flooding with a particular rain event as shown in Table 3 below.

Likelihood	AEP
Rare	1%
Very Unlikely	2%
Unlikely	5%
Possible	10%
Likely	0.2EY
Very Likely	0.5EY
Almost Certain	1EY

Table 3 – Likelihood

The risk assessment equates the consequence of flooding to the severity of the injury that could occur. It is assumed that these consequences directly correlate with the product of the depth and velocity of the overland flow path. That is, the deeper and faster a flow path is, the more serious unjust will occur from being exposed to that flow. DRAINS considers a depth and velocity product of greater than 0.4 to be unsafe.

The financial consequences from property damage are considered to be the sum total of the number of properties multiplied by the cost per property described in Table 2. The assessment of the consequences of flooding are shown in Table 4 below.

Consequence	Risk to Life		Risk to property
		DxV product	Total Cost of repairs to properties affected
Insignificant	Nil	0	< $20k
Minor	First Aid	0 - 0.4	$20k - $50k
Moderate	Medical Treatment	0.4 - 0.6	$50k - $100k
Major	Disability	0.6 - 1.2	$100k - $500k
Catastrophic	Fatality	> 1.2	> $500k

Table 4 – Consequences

As for other Council risk assessments, the risk rating is a product of the likelihood and consequence, which is shown in Table 5 below.

Risk Rating					
Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Low-Medium	Medium	Medium-High
Very Unlikely	Low	Low	Low-Medium	Medium	Medium-High
Unlikely	Low	Low	Medium	Medium-High	High-Medium
Possible	Low	Low-Medium	Medium	High-Medium	High-Medium
Likely	Low	Low-Medium	Medium-High	High-Medium	High
Very Likely	Low	Low-Medium	Medium-High	High	High
Almost Certain	Low	Low-Medium	Medium-High	High	High

Table 5 – Risk Rating

Each individual catchment was analysed for a range of rain events:

- 1% (major)
- 5% (minor)
- 10% (minor)
- 0.2EY (minor)
- 0.5EY (minor)
- 1EY (minor)

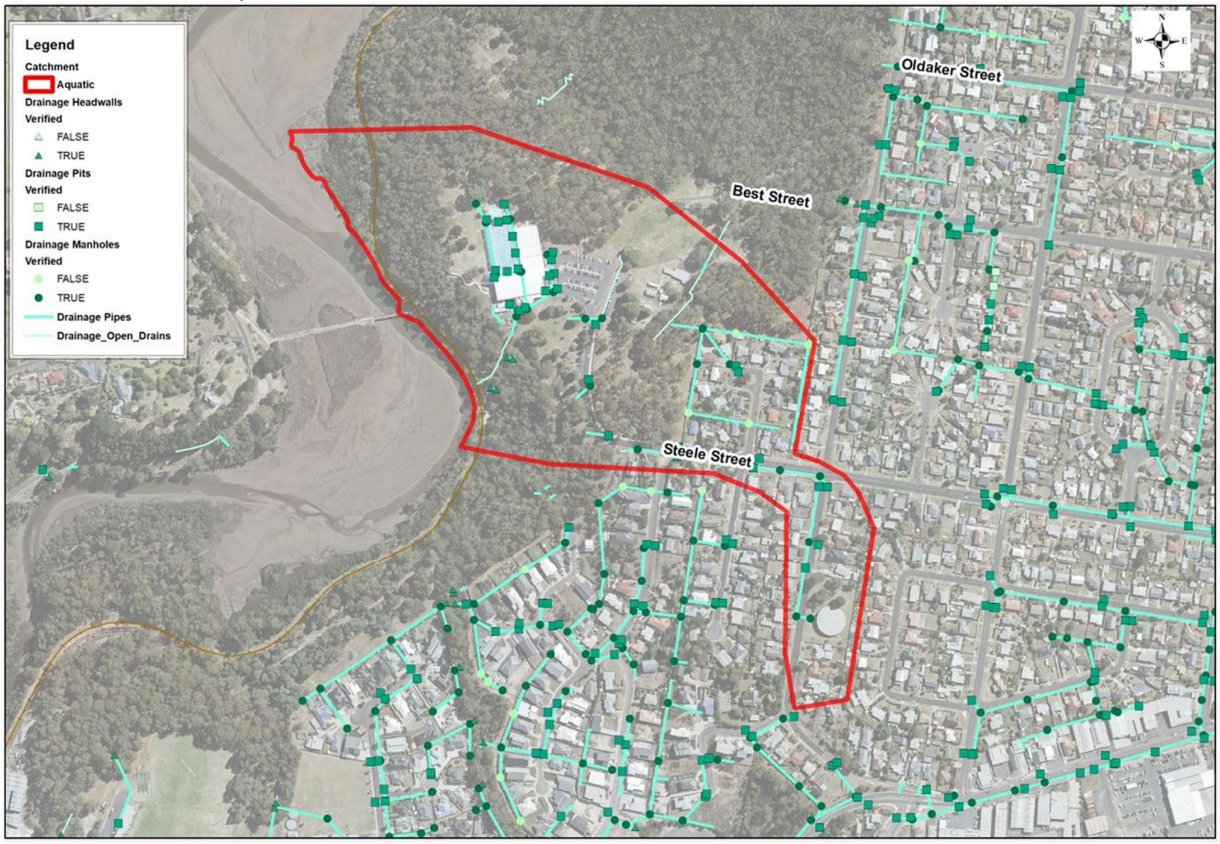
The risk rating applied to each catchment was taken as the highest risk from this range. The details of the risk assessments are shown in Section 6 below, while a summary of the assessments is shown in Section 7.

6 Stormwater Catchments – Risk of Flooding:

This section of the SSMP details the location and key characteristics of each urban catchment and identifies the risk to people and property from flooding.

For catchments that are yet to be assessed, details of the program to complete these assessments are provided in the action plan.

6.1 Catchment Aquatic

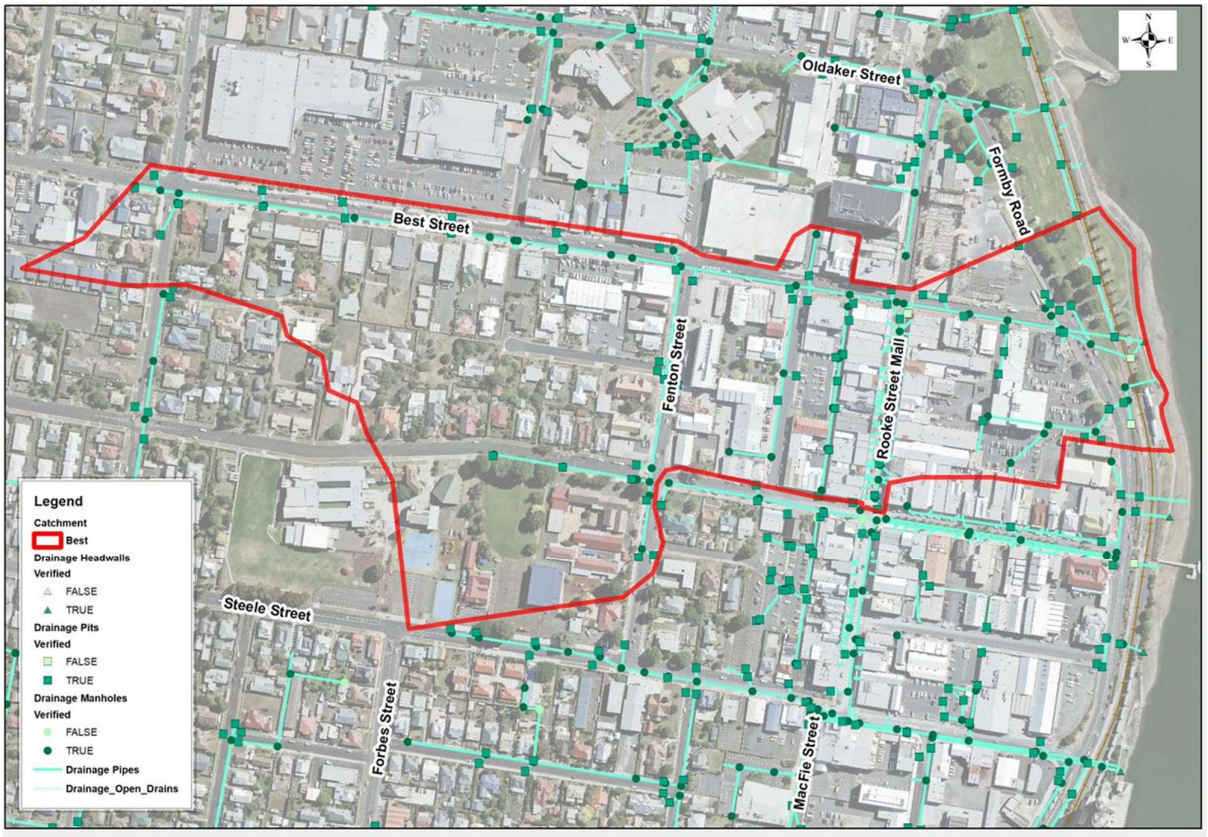


Approx. land area (ha)	18.88
Land use	Recreation, Environmental & Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.2 Catchment Ashburner

Approx. land area (ha)	9.59
Land use	Urban mixed use / General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.3 Catchment Best

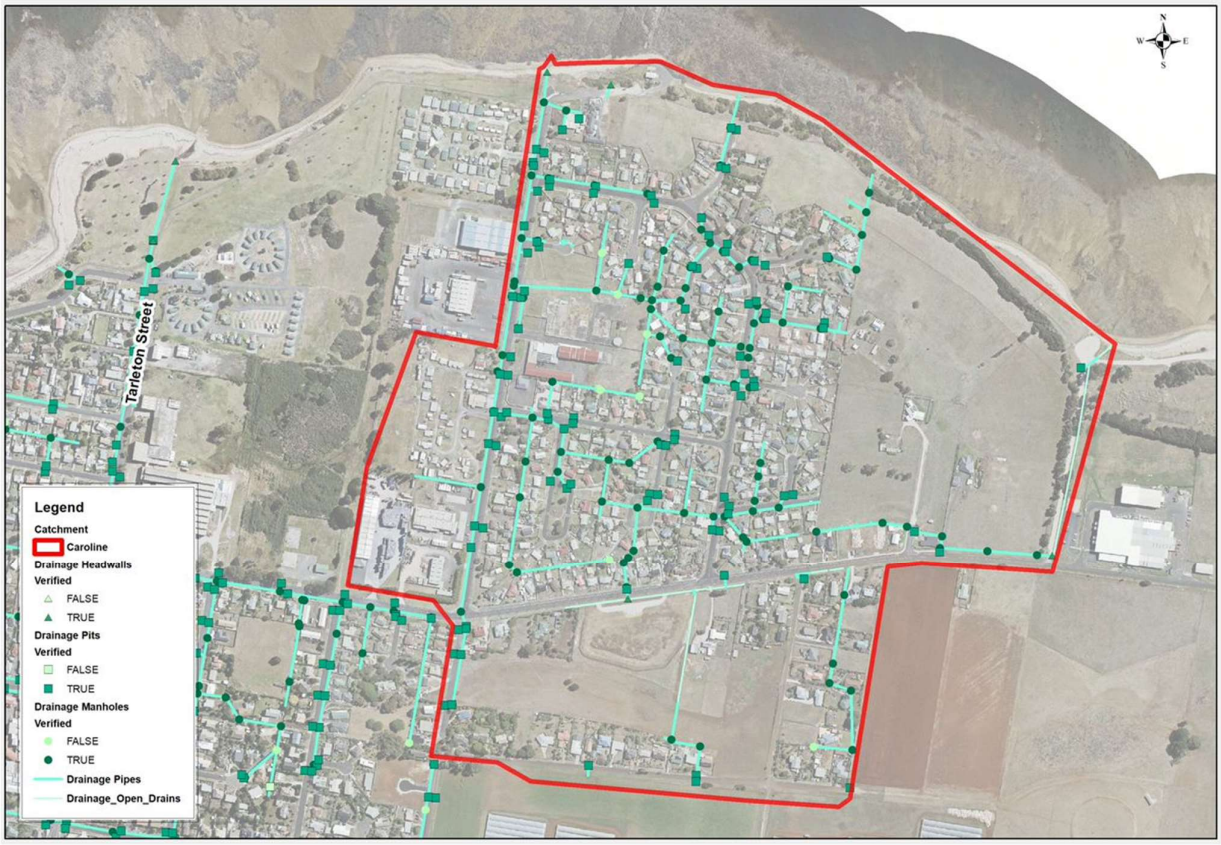


Approx. land area (ha)	18.52
Land use	Central Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	1EY (1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.4 Catchment Bluff

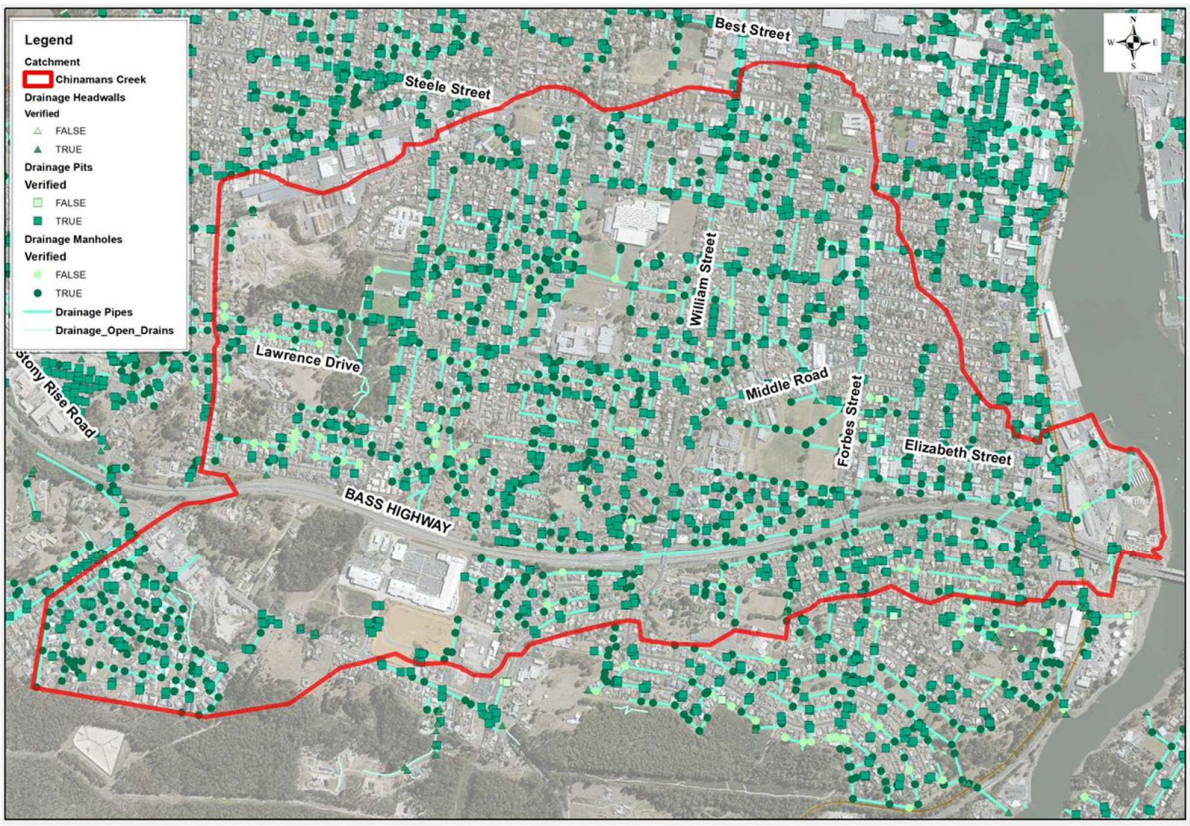
Approx. land area (ha)	17.99
Land use	Recreation, Open Space & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.5 Catchment Caroline



Approx. land area (ha)	75.95
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.6 Catchment Chinamans Creek

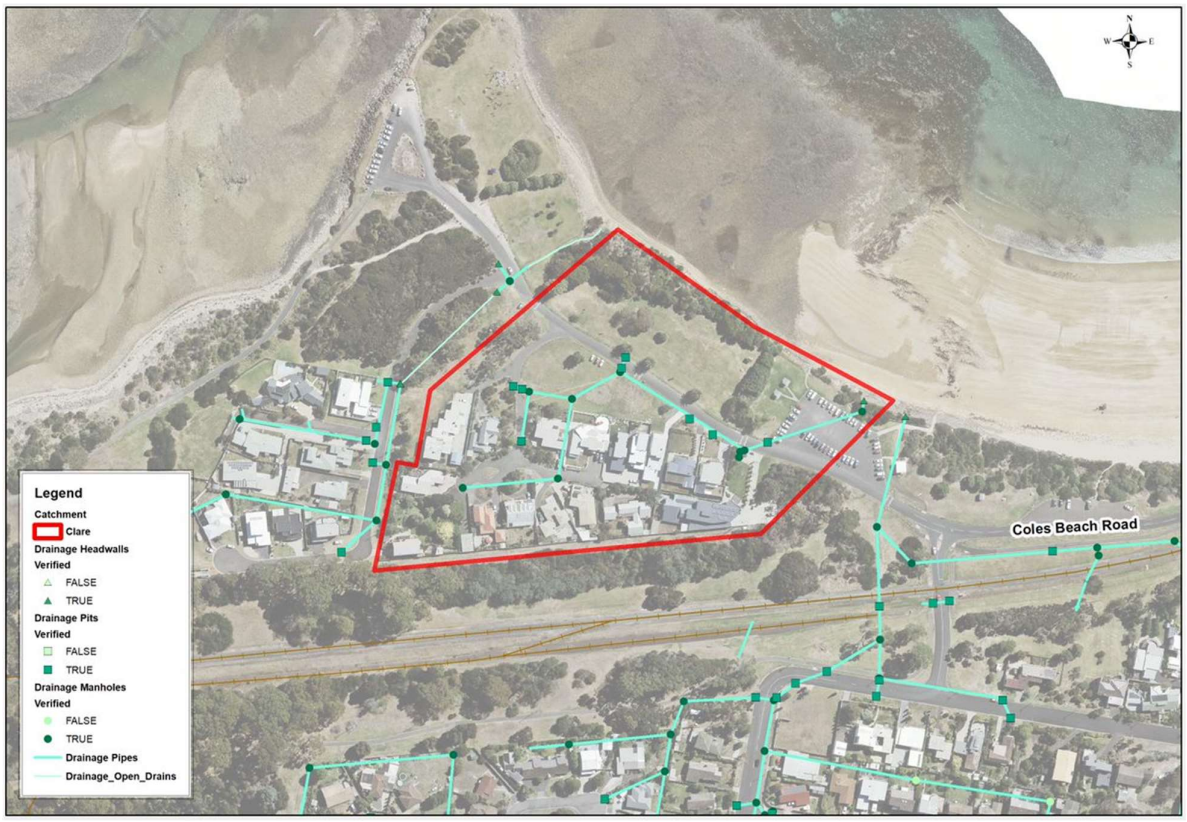


Approx. land area (ha)	445.92
Land use	General Residential, General Industrial & Commercial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	High

6.7 Catchment Church

Approx. land area (ha)	12.03
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.8 Catchment Clare



Approx. land area (ha)	3.87
Land use	Open Space & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

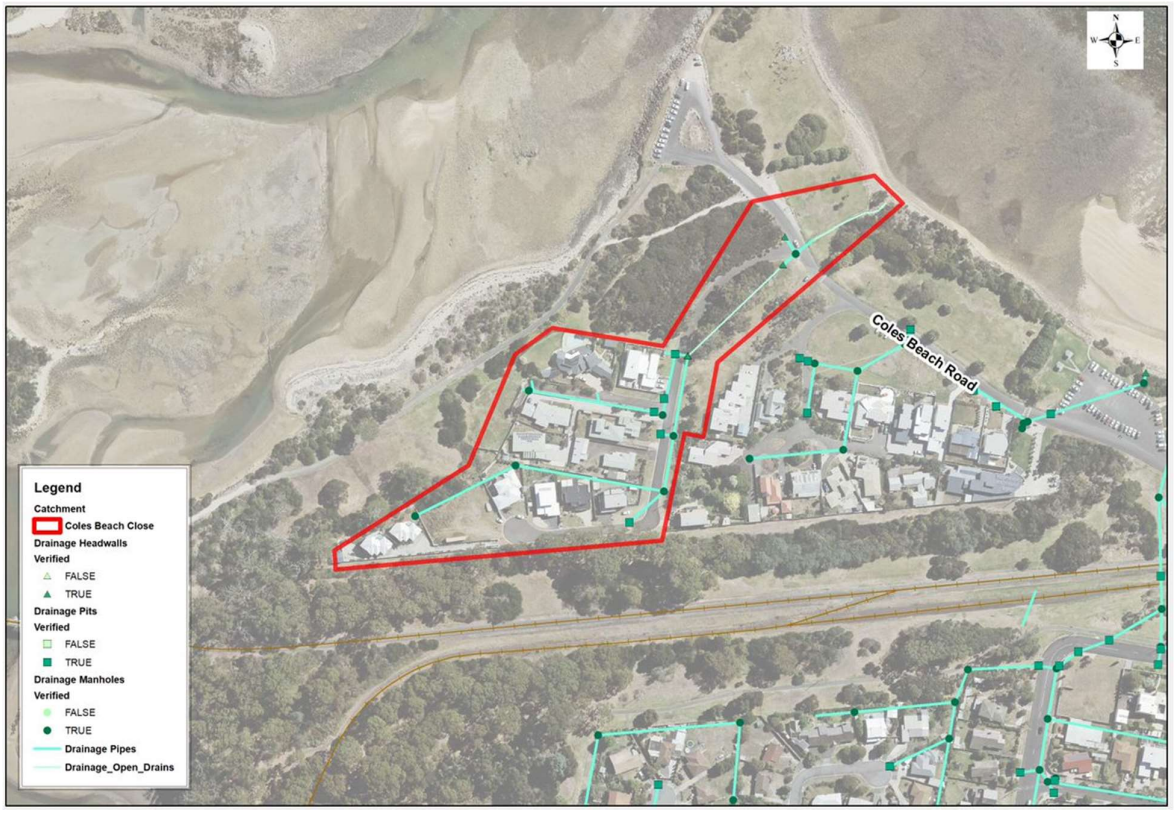
6.9 Sub-Catchment Clayton Drive

Approx. land area (ha)	52.76
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.2EY (1 in 5 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.10 Catchment Clements

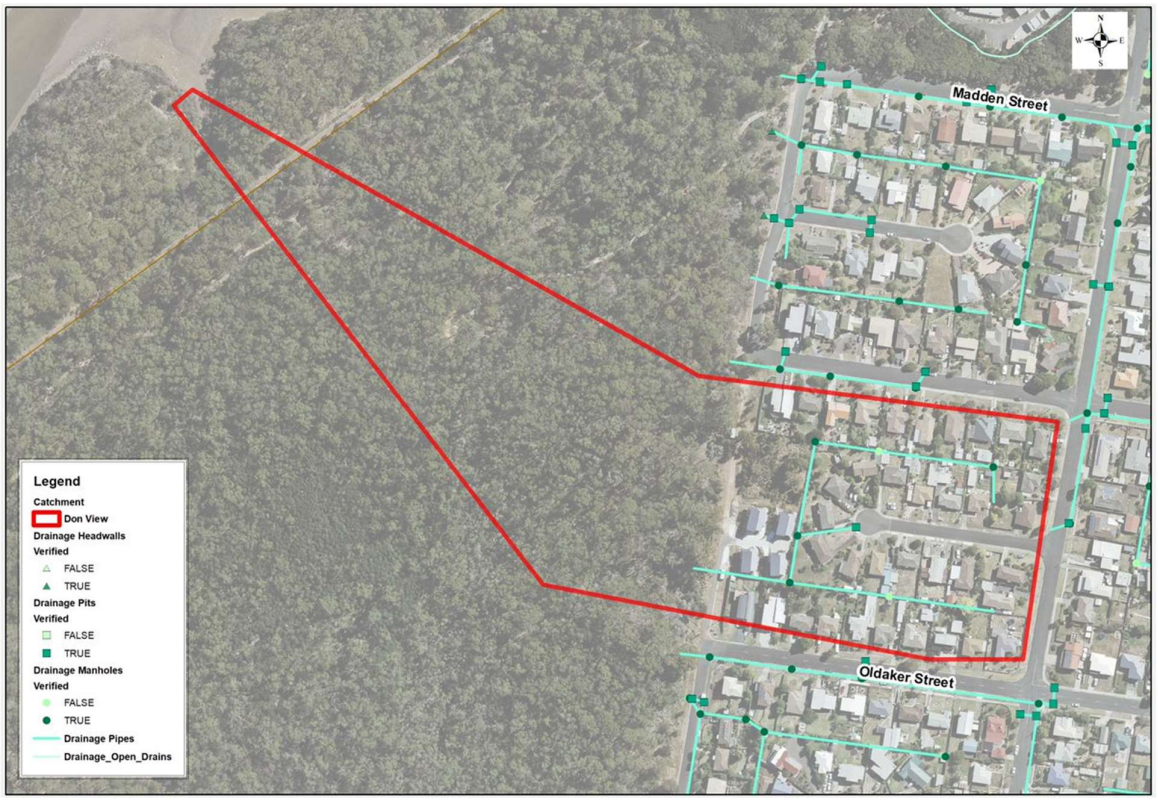
Approx. land area (ha)	11.14
Land use	Recreation, Open Space & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.11 Catchment Coles Beach Close



Approx. land area (ha)	2.67
Land use	Open Space & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	10% AEP (1 in 10 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.12 Catchment Don View



Approx. land area (ha)	7.39
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.13 Catchment Douglas

Approx. land area (ha)	6.59
Land use	Light Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.14 Catchment Drew

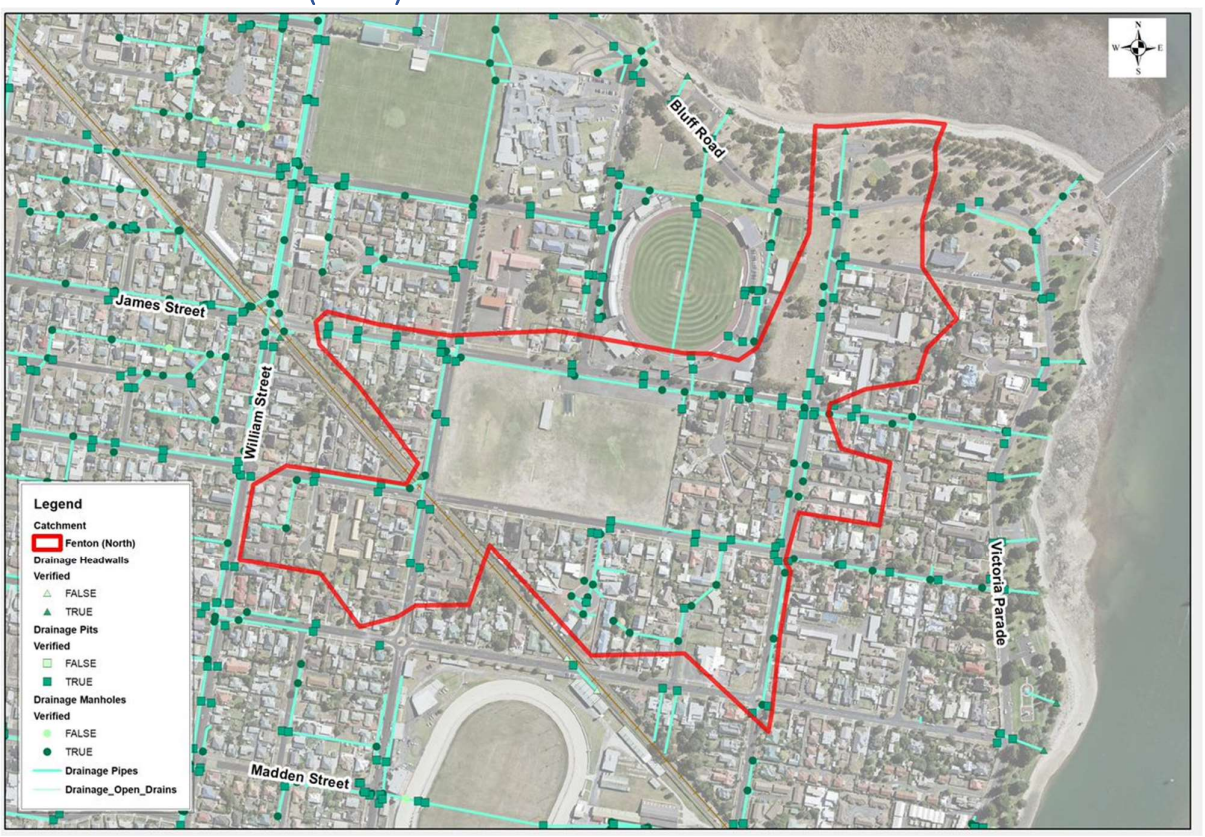
Approx. land area (ha)	13.34
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.15 Catchment Enderly

Modelling is planned be completed in 2021.

Approx. land area (ha)	3.24
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.16 Catchment Fenton (North)

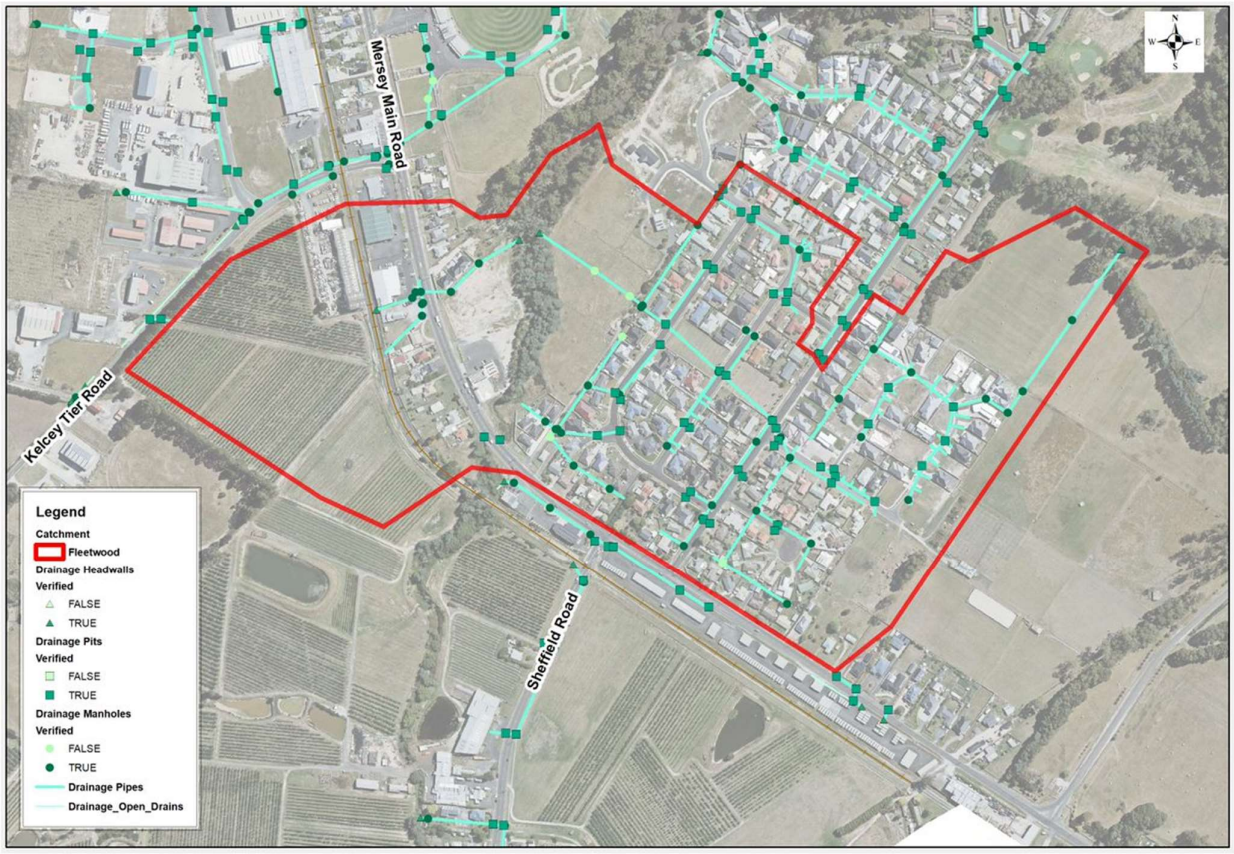


Approx. land area (ha)	27.23
Land use	General Residential, Recreation & Open Space
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.17 Catchment Fire Station

Approx. land area (ha)	1.68
Land use	Urban mixed use
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.18 Catchment Fleetwood

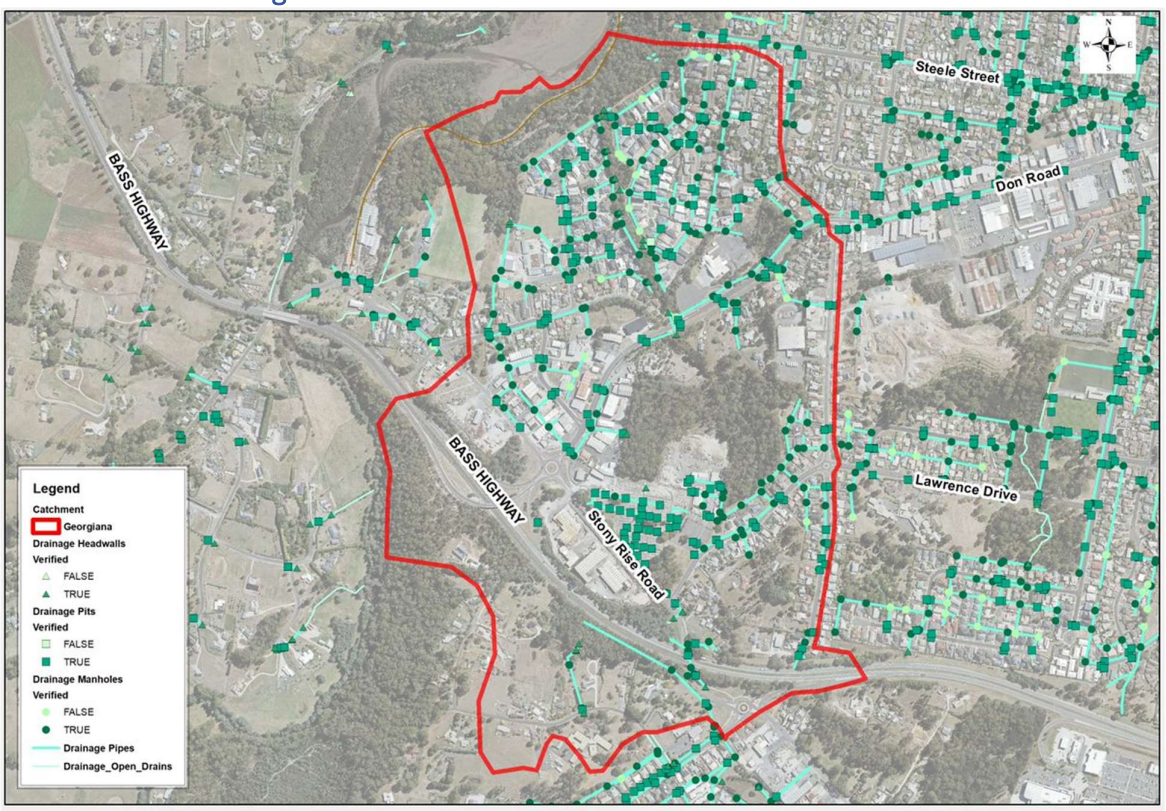


Approx. land area (ha)	38.85
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.19 Catchment George

Approx. land area (ha)	5.76
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.20 Catchment Georgiana



Approx. land area (ha)	128.79
Land use	Light Industrial & General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.21 Catchment Gloucester

Approx. land area (ha)	4.22
Land use	Open Space
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.22 Catchment Green Bank

Modelling is planned be completed in 2021.

Approx. land area (ha)	24.71
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.23 Catchment Havelock

Approx. land area (ha)	12.6
Land use	Light Industrial & General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

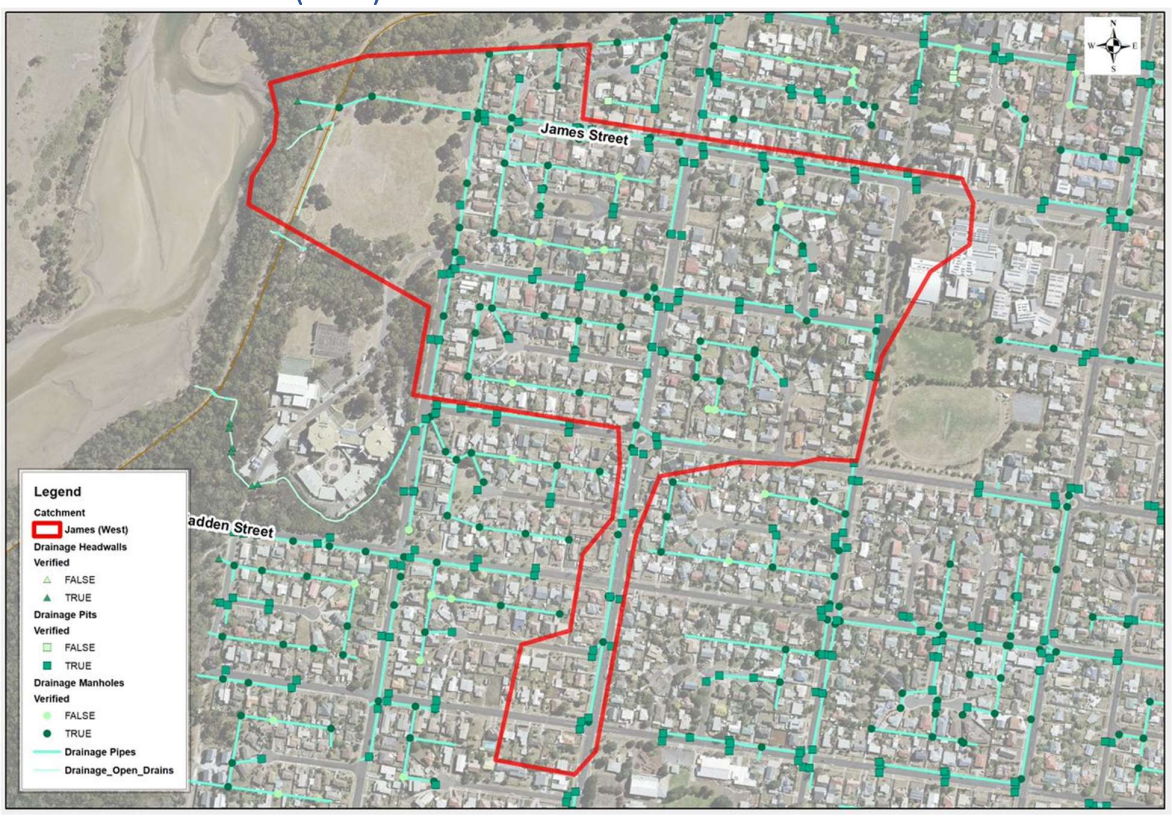
6.24 Catchment Highfield

Approx. land area (ha)	37.85
Land use	General residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.25 Catchment James (East)

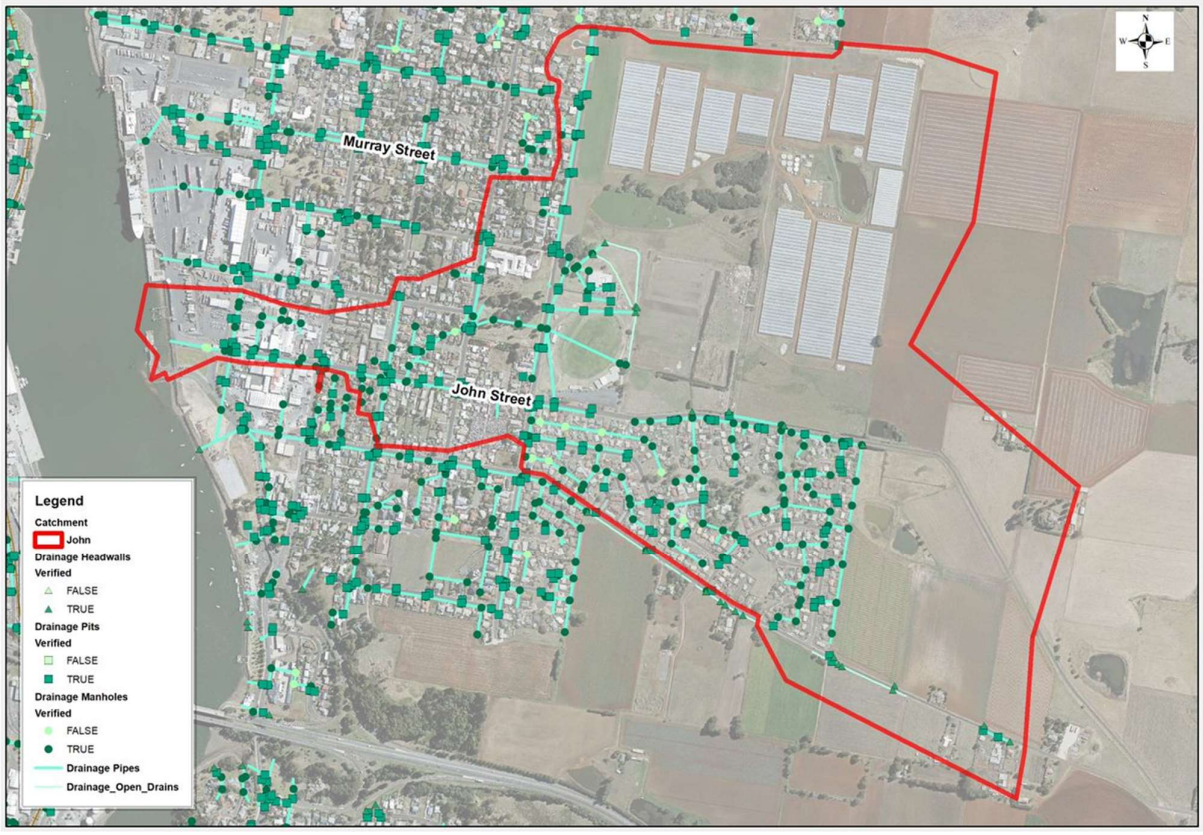
Approx. land area (ha)	3.02
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.26 Catchment James (West)



Approx. land area (ha)	33.1
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.27 Catchment John



Approx. land area (ha)	190.94
Land use	General Residential / Light Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium-High

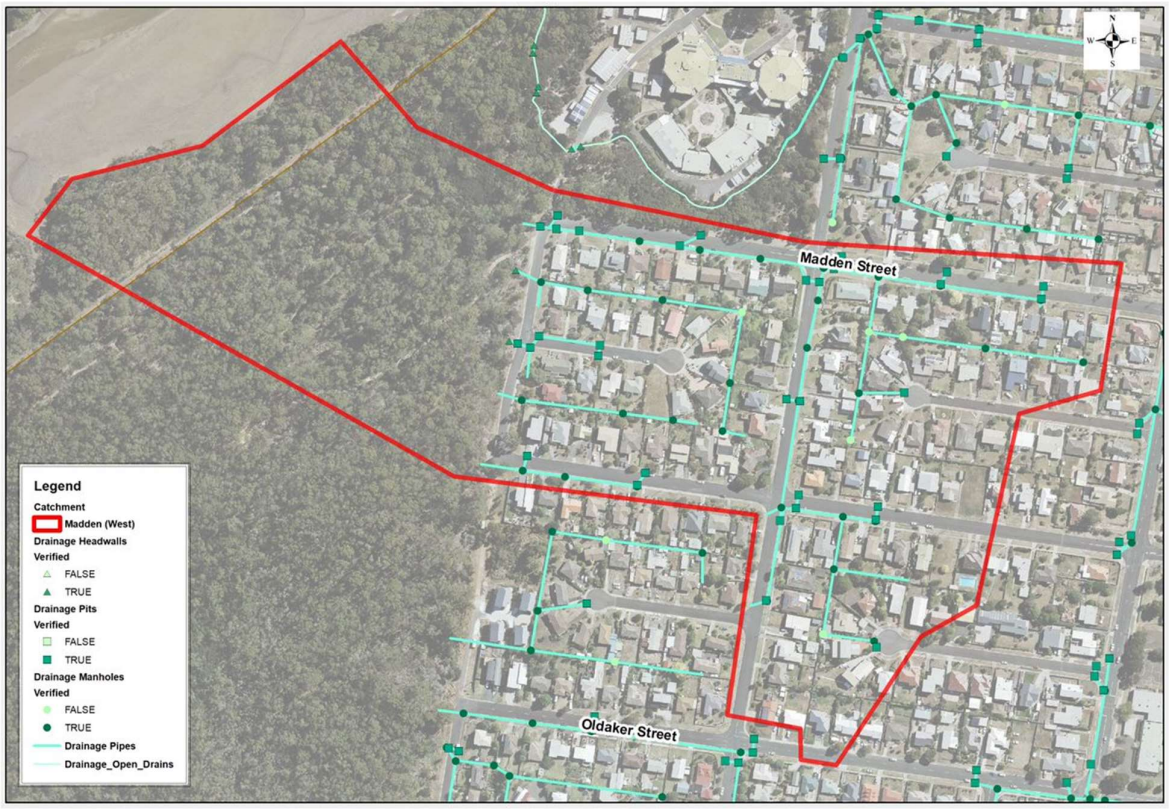
6.28 Catchment King

Approx. land area (ha)	1.79
Land use	Central Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.2EY (1 in 5 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.29 Catchment Madden (Showground)

Approx. land area (ha)	24.74
Land use	General Residential & Recreation
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.30 Catchment Madden (West)



Approx. land area (ha)	17.61
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

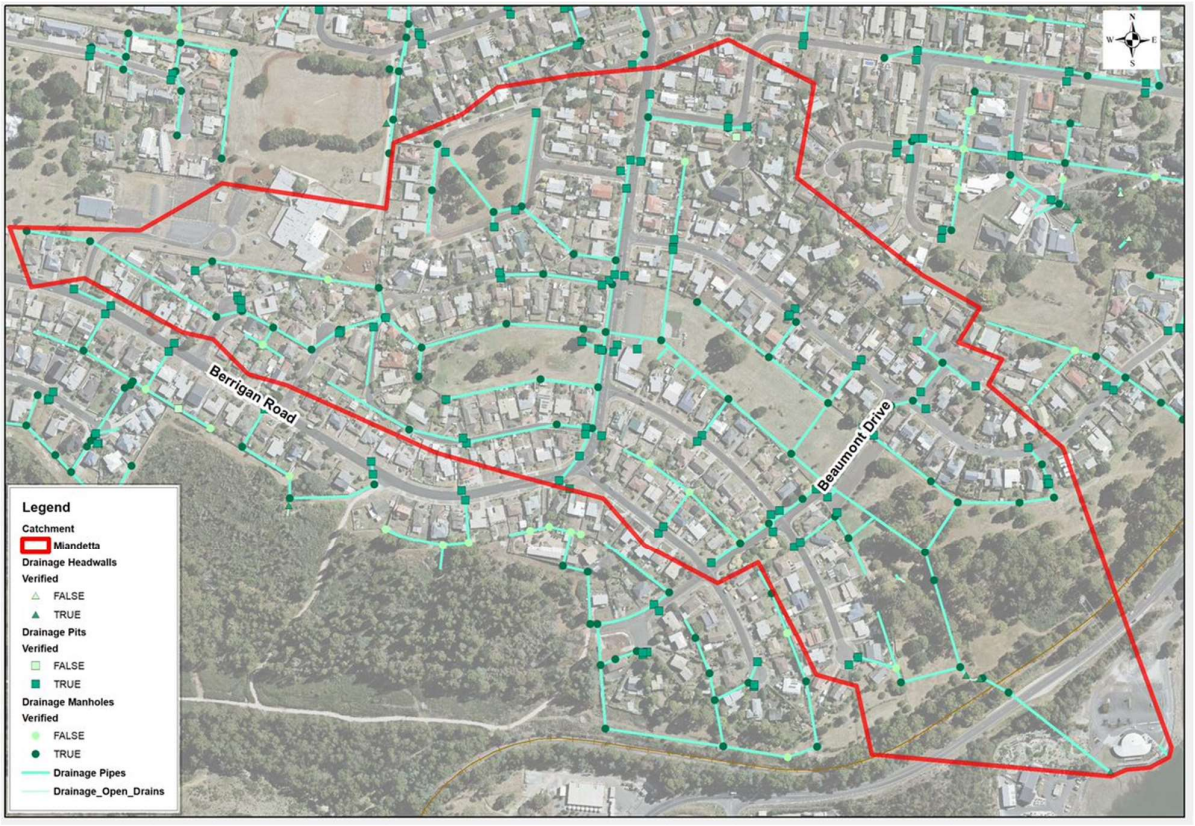
6.31 Catchment Malunnah

Approx. land area (ha)	2.23
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.32 Catchment McCabe

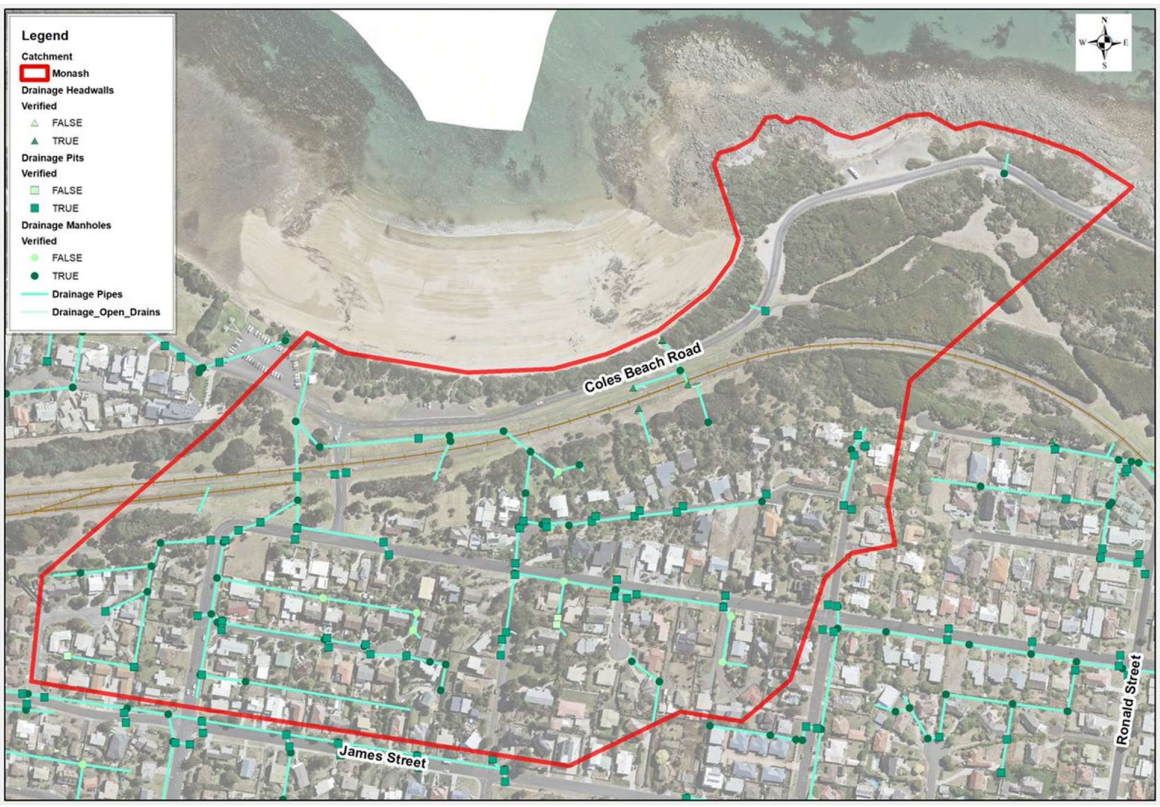
Approx. land area (ha)	14.1
Land use	General Residential & Community Purpose
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.33 Catchment Miandetta



Approx. land area (ha)	35.03
Land use	General Residential & Open Space
Hydraulic modelling undertaken	2019
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.34 Catchment Monash

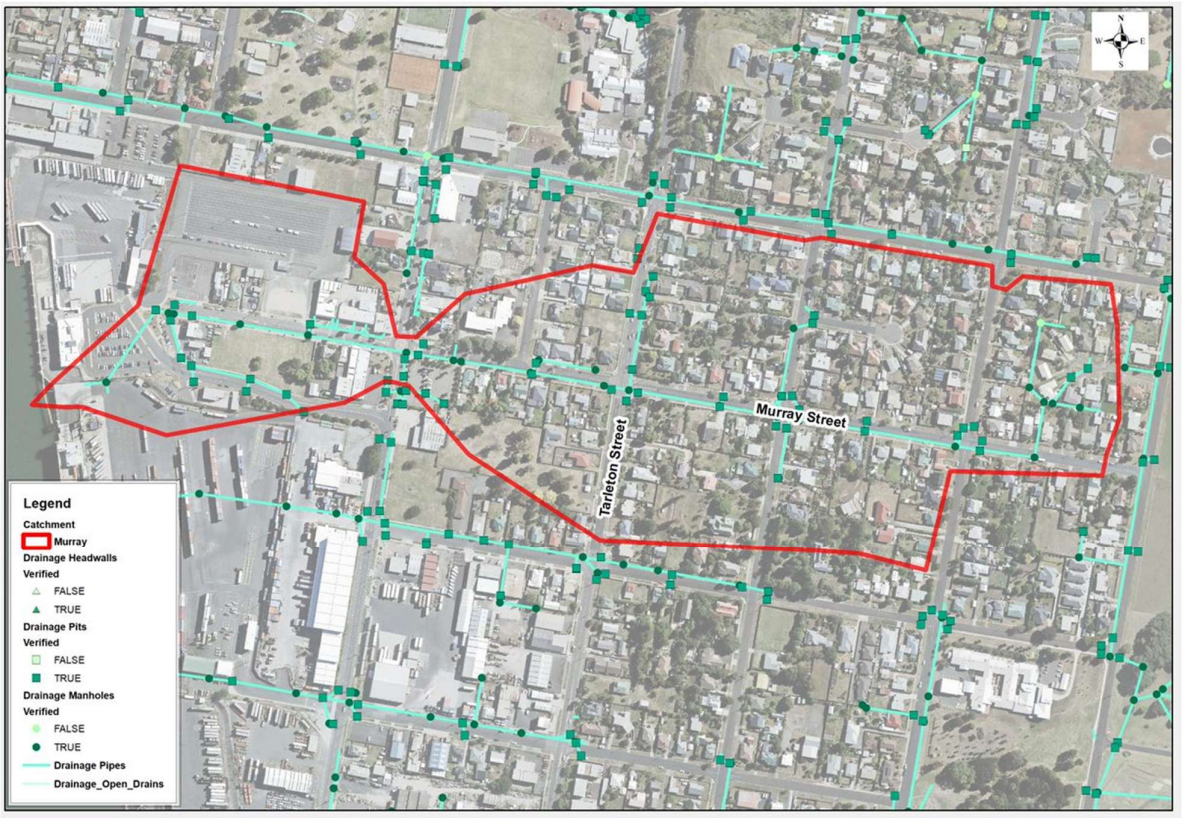


Approx. land area (ha)	27.06
Land use	General Residential & Open Space
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.35 Catchment Mungala

Approx. land area (ha)	7.02
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.36 Catchment Murray

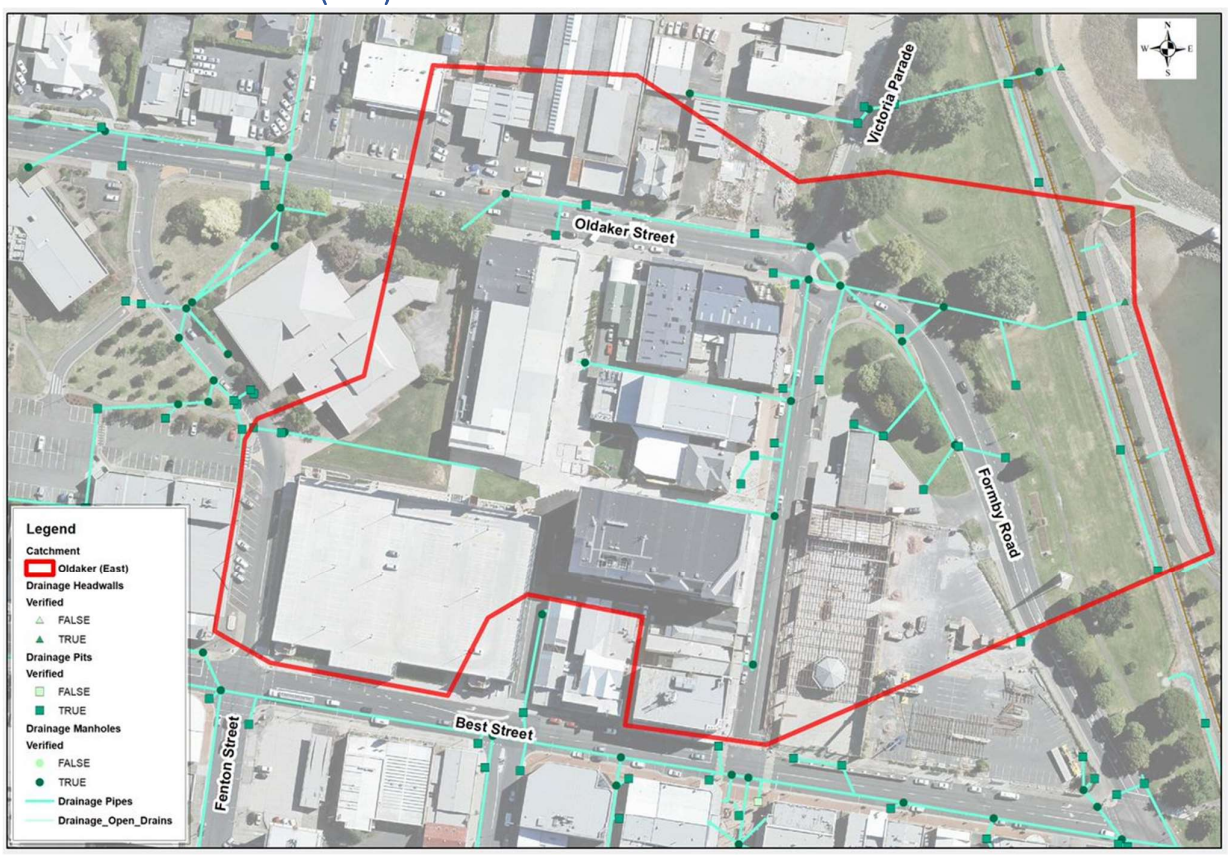


Approx. land area (ha)	23.11
Land use	General Residential / Local Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.37 Catchment Nicholls

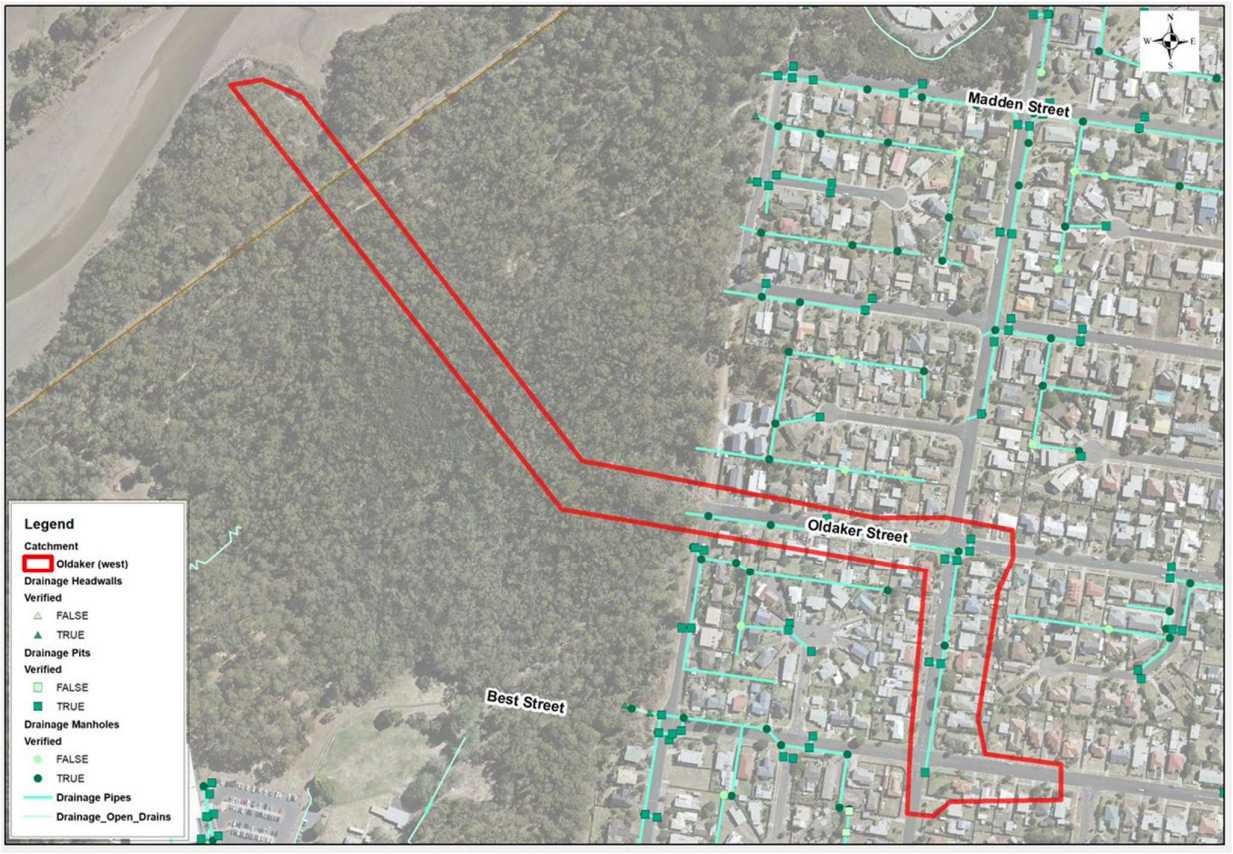
Approx. land area (ha)	6.03
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	10% AEP (1 in 10 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.38 Catchment Oldaker (East)



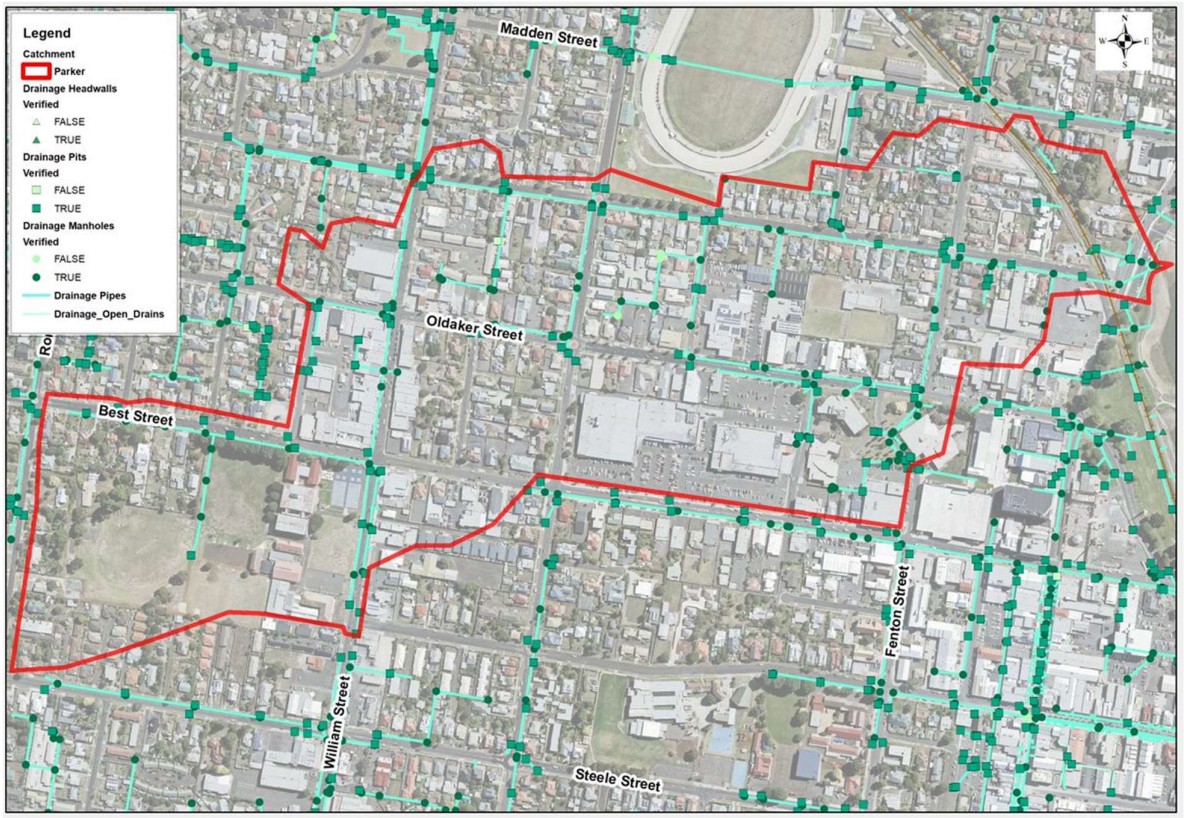
Approx. land area (ha)	5.72
Land use	Central Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.39 Catchment Oldaker (West)



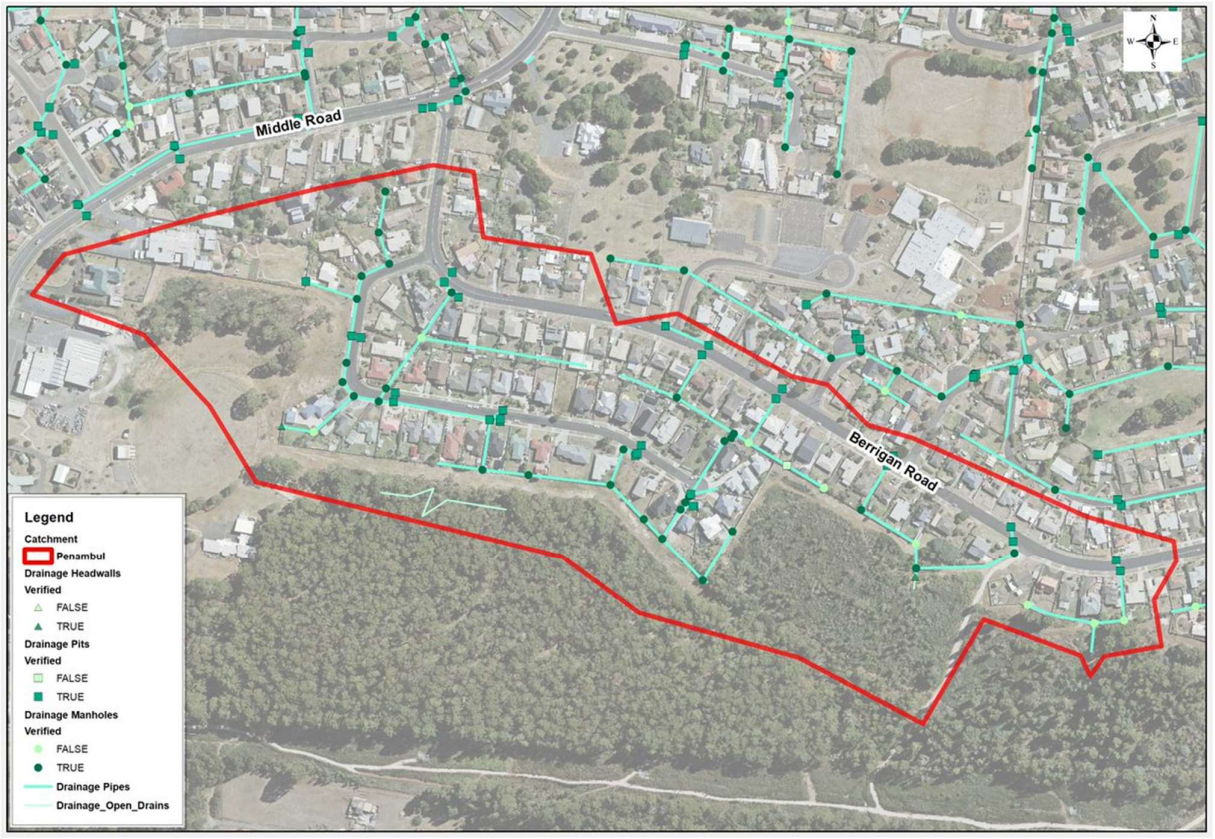
Approx. land area (ha)	4.53
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.2EY (1 in 5 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.40 Catchment Parker



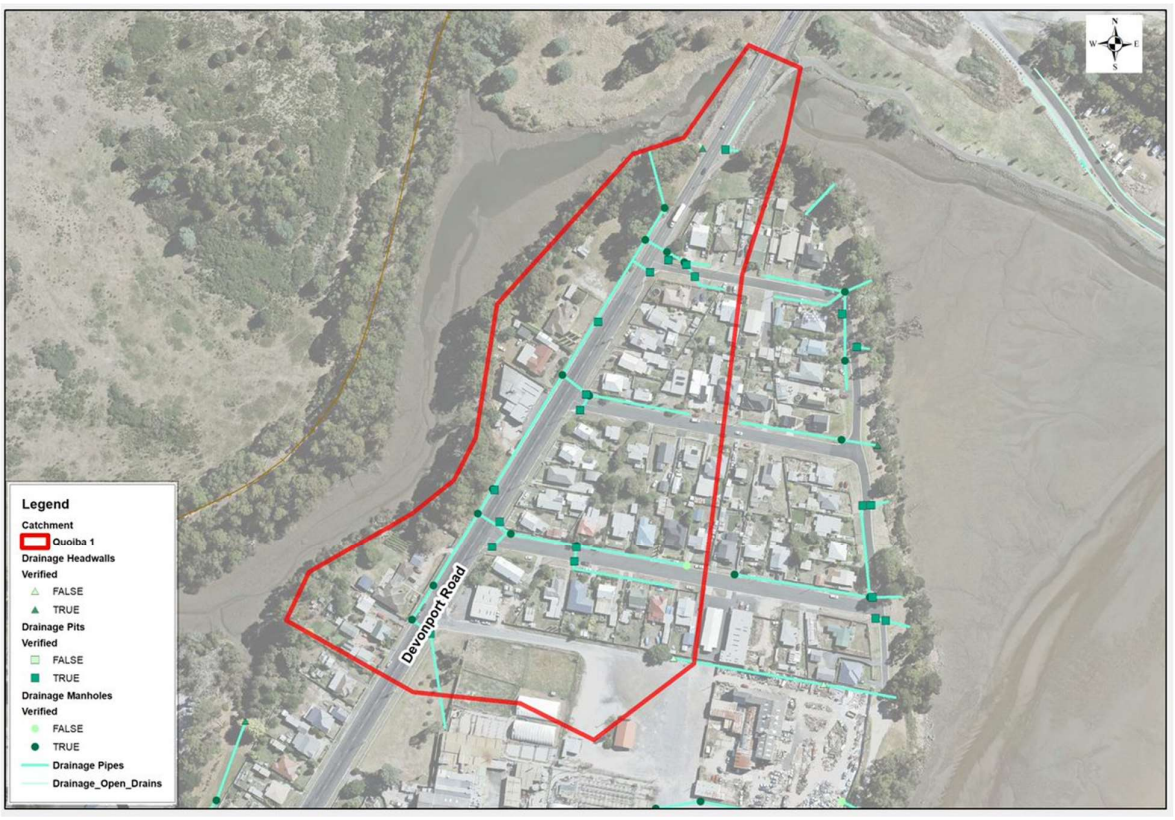
Approx. land area (ha)	49.17
Land use	Central Business & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	High

6.41 Catchment Penambul



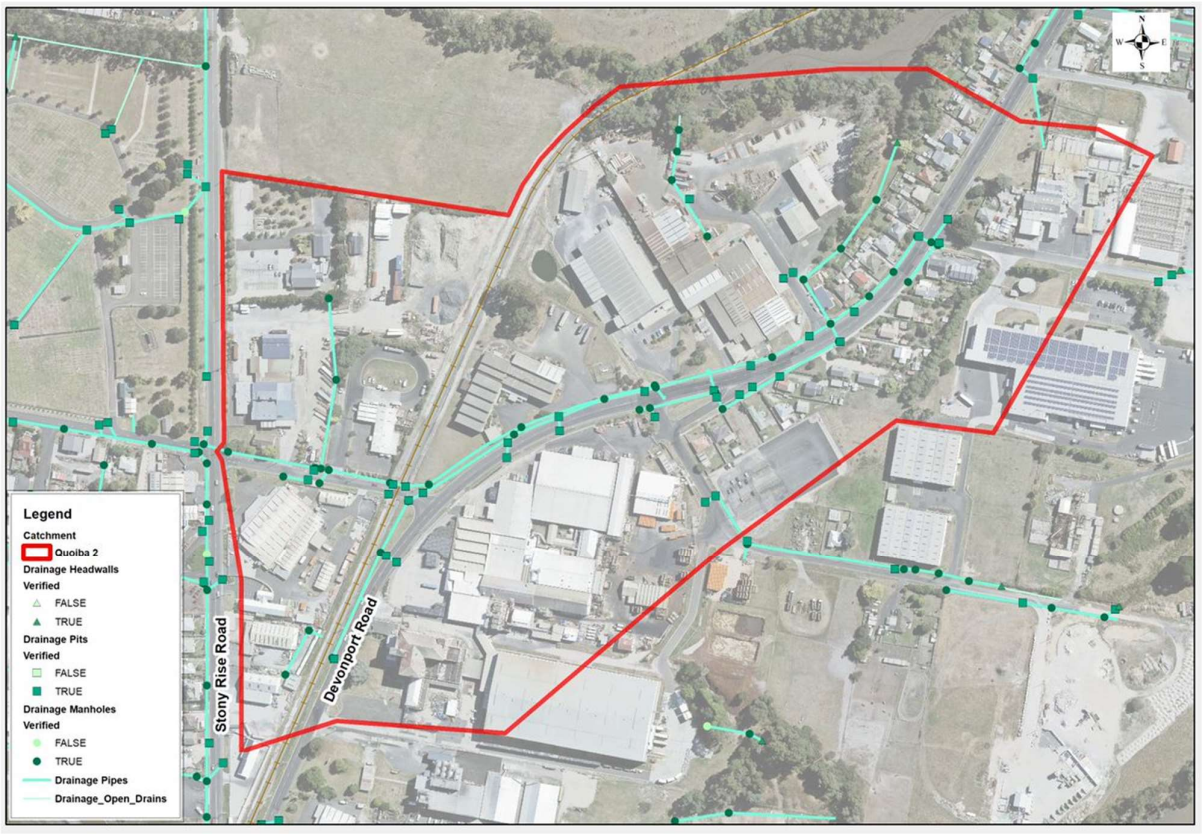
Approx. land area (ha)	19.18
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.42 Catchment Quoiba 1



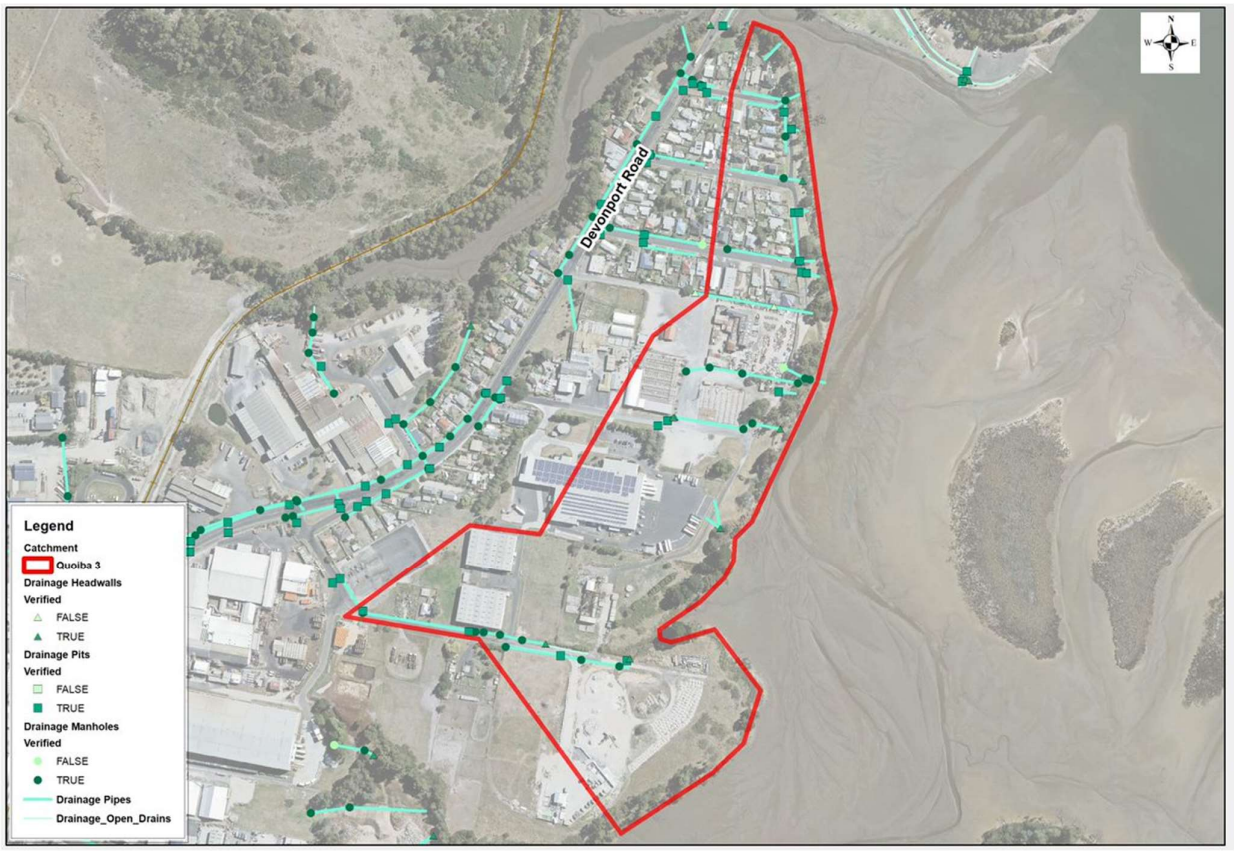
Approx. land area (ha)	6.17
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.43 Catchment Quoiba 2



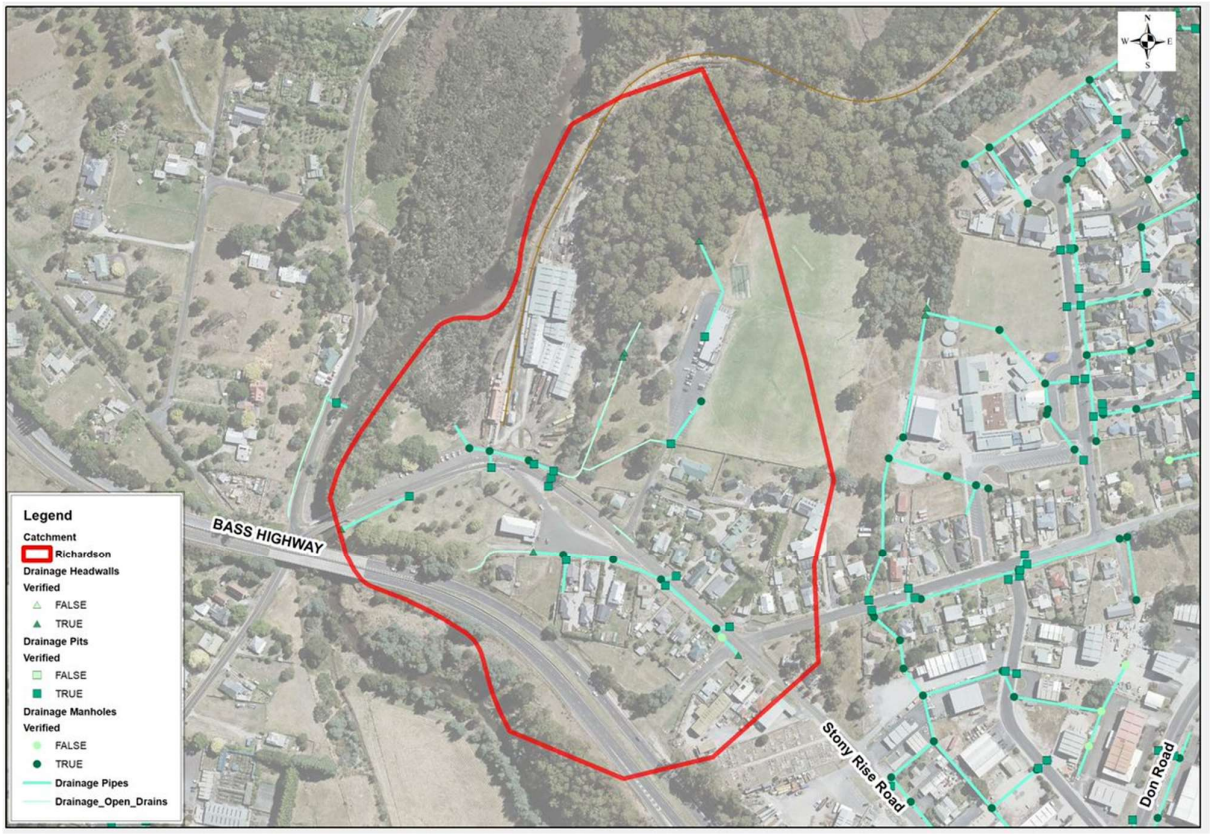
Approx. land area (ha)	28.59
Land use	General Industrial, Light Industrial & Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.44 Catchment Quoiba 3



Approx. land area (ha)	18.81
Land use	General Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.45 Catchment Richardson



Approx. land area (ha)	16.17
Land use	Open Space, Environmental Management, Recreation and General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.46 Catchment River 1

Modelling is planned to be completed in 2021.

Approx. land area (ha)	18.69
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.47 Catchment River 2

Modelling is planned to be completed in 2021.

Approx. land area (ha)	6.89
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.48 Catchment River 3

Modelling is planned to be completed in 2021.

Approx. land area (ha)	8.87
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.49 Catchment River 4

Modelling is planned to be completed in 2021.

Approx. land area (ha)	12.76
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.50 Catchment River 5

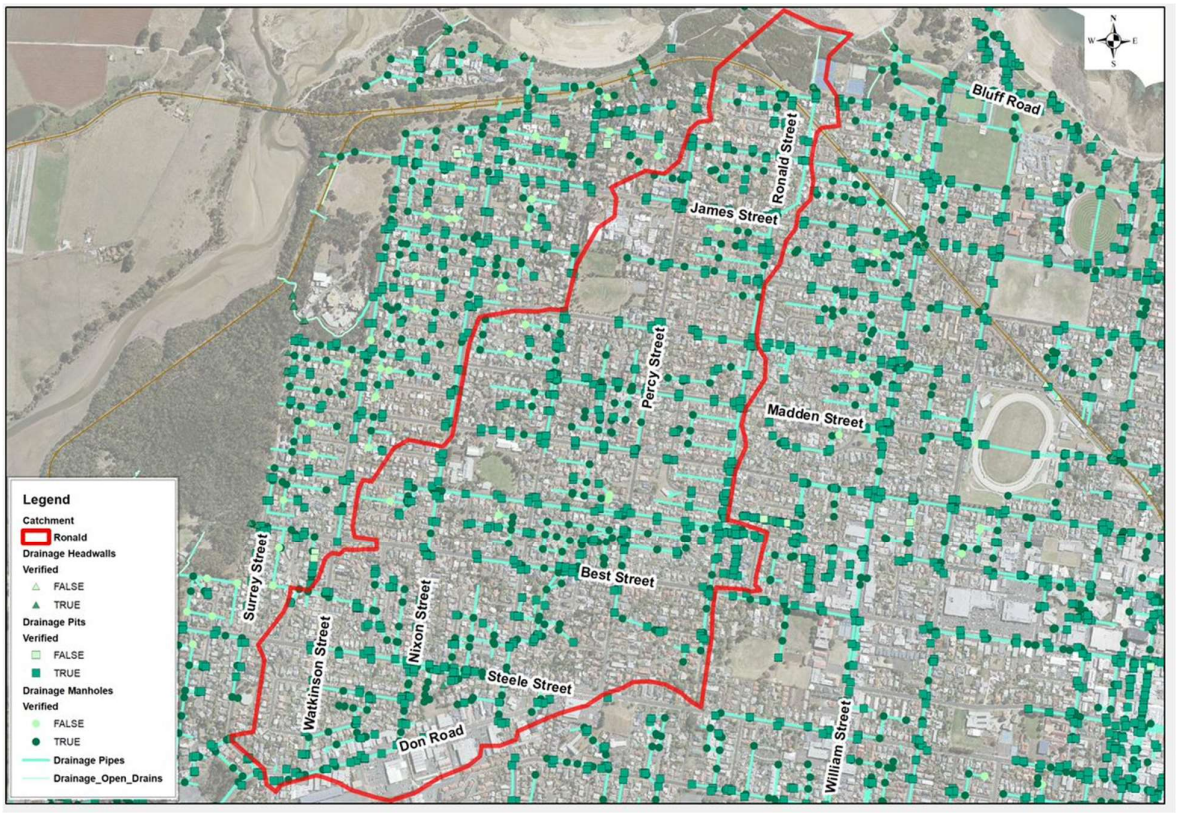
Modelling is planned to be completed in 2021.

Approx. land area (ha)	6.74
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.51 Catchment Riverview

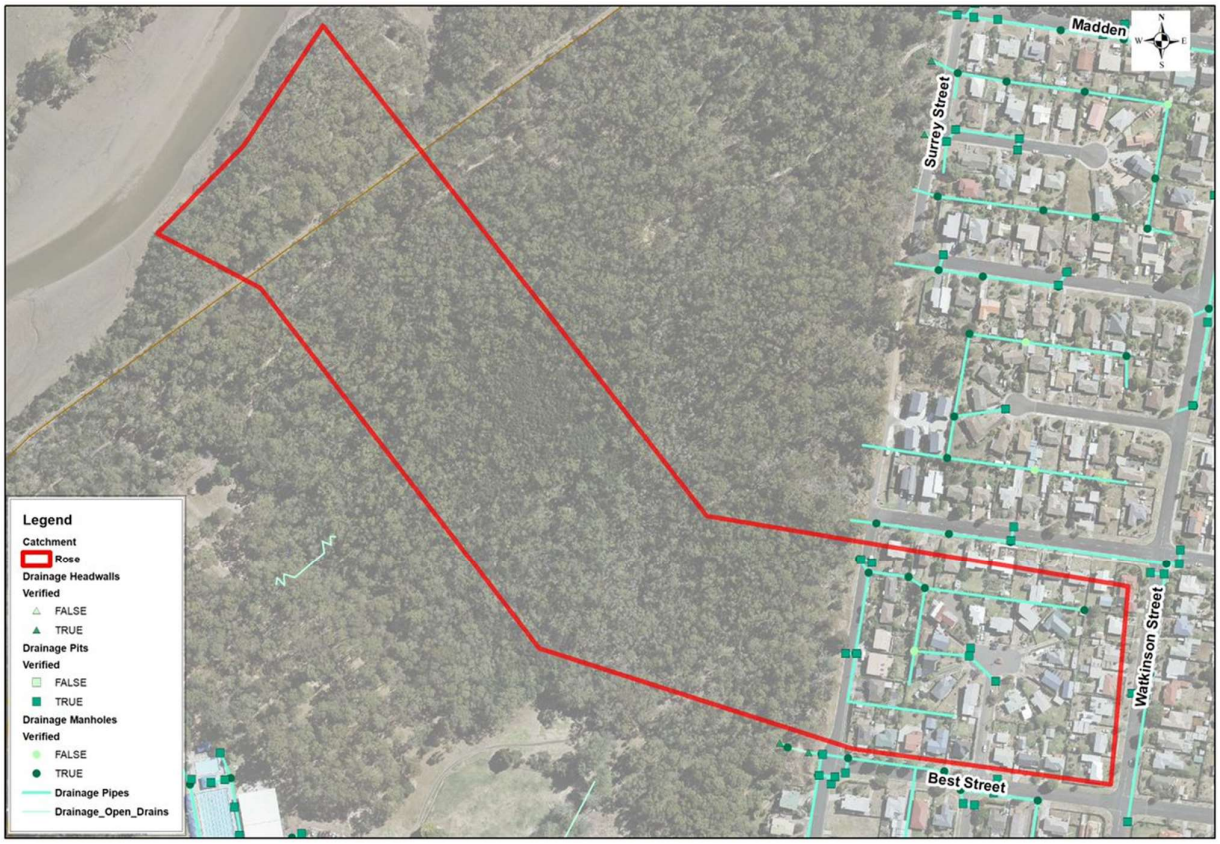
Approx. land area (ha)	9.93
Land use	General Residential & Local Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.52 Catchment Ronald



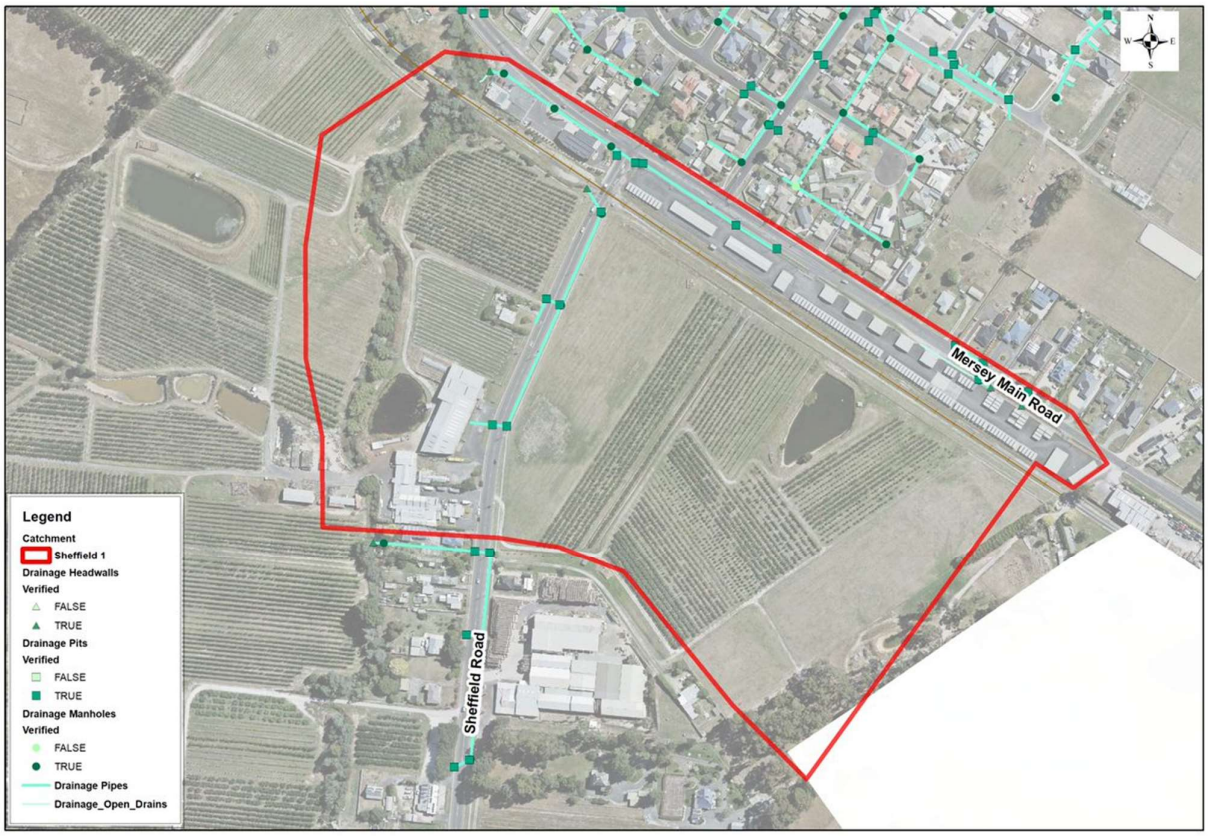
Approx. land area (ha)	172.83
Land use	General Residential & Commercial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	High

6.53 Catchment Rose



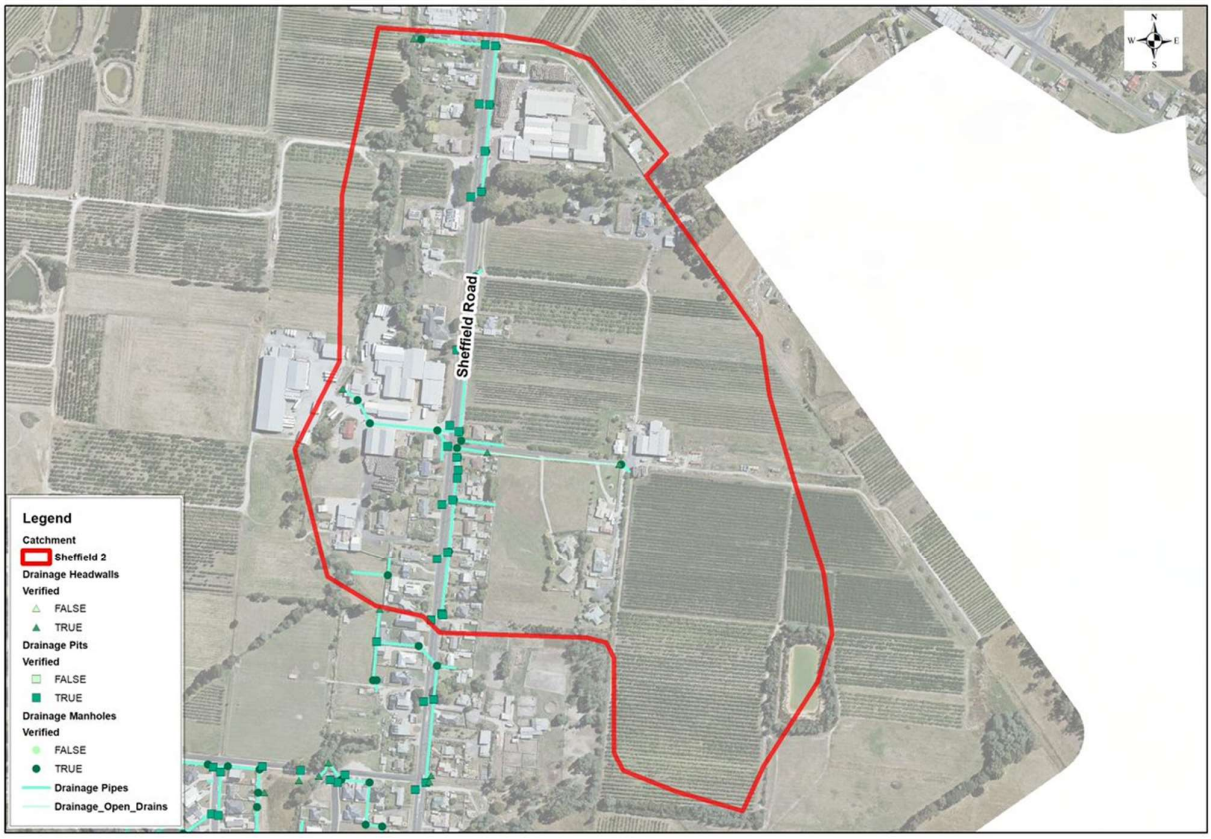
Approx. land area (ha)	11.67
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	1EY (1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.54 Catchment Sheffield 1



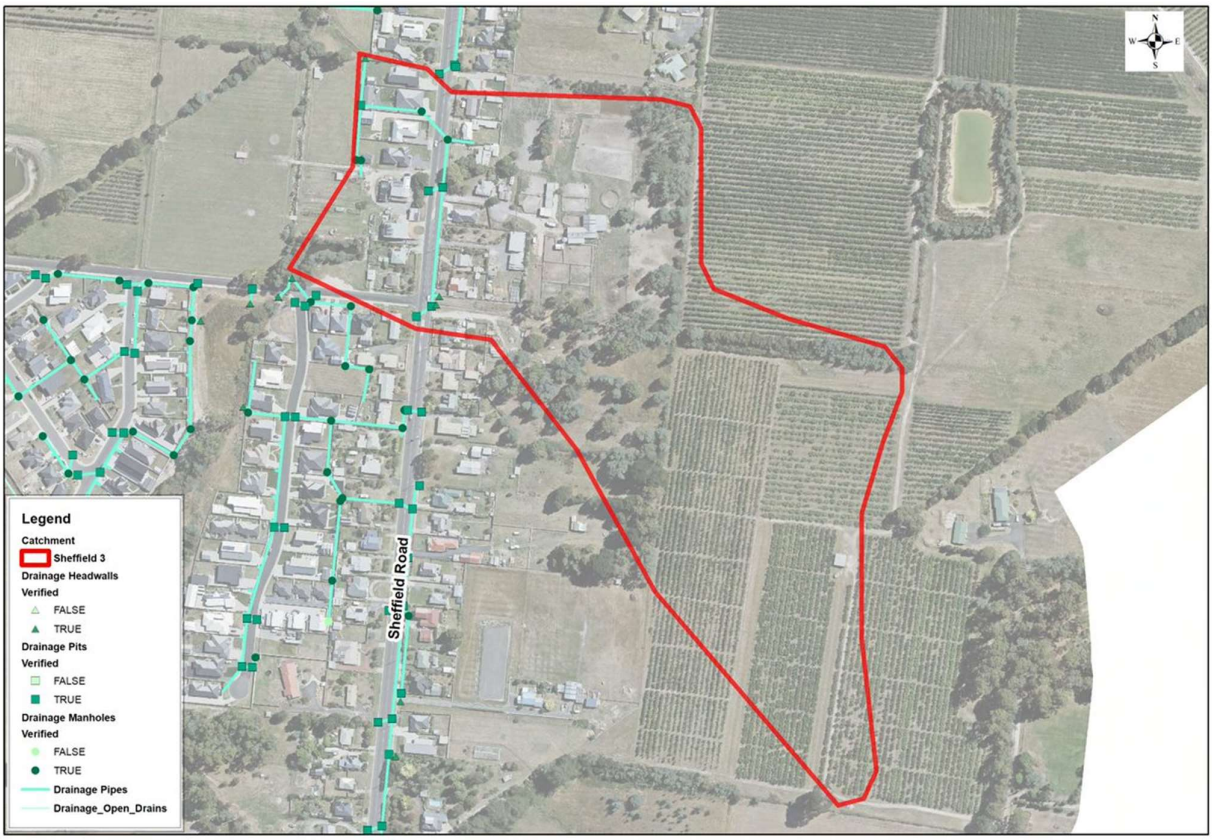
Approx. land area (ha)	20.84
Land use	Rural Resource
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.2EY (1 in 5 ARI)
Risk assessment undertaken	Low-Medium
Risk Rating	2019

6.55 Catchment Sheffield 2



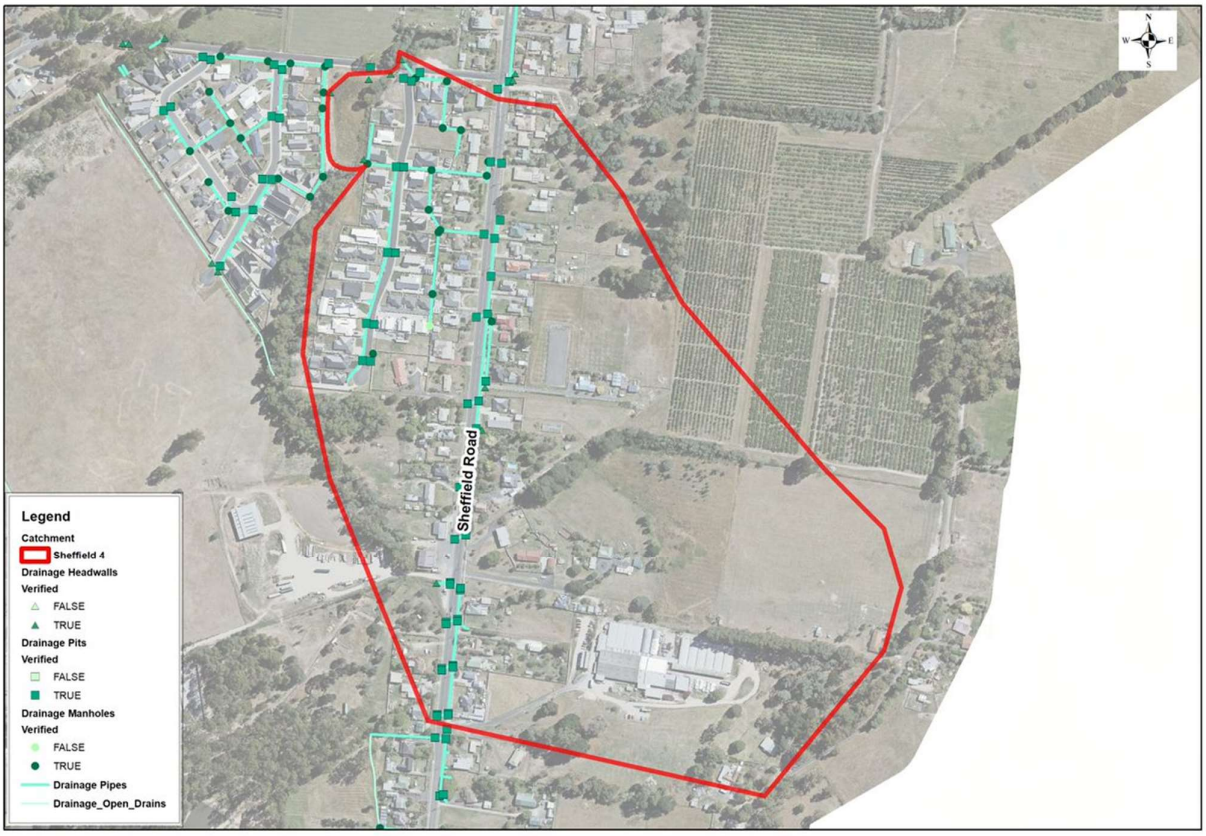
Approx. land area (ha)	38.04
Land use	Rural Resource & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.56 Catchment Sheffield 3



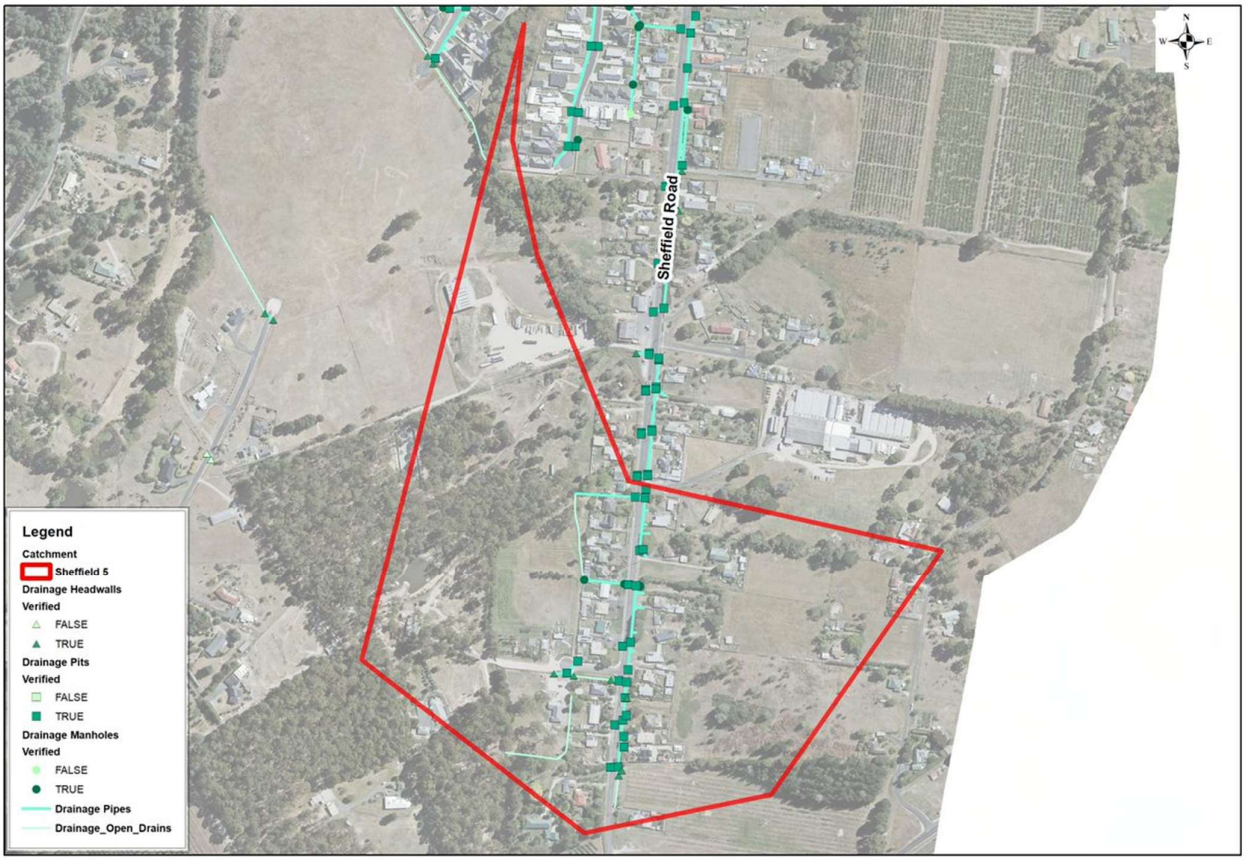
Approx. land area (ha)	13.73
Land use	Rural Resource & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	10% AEP (1 in 10 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.57 Catchment Sheffield 4



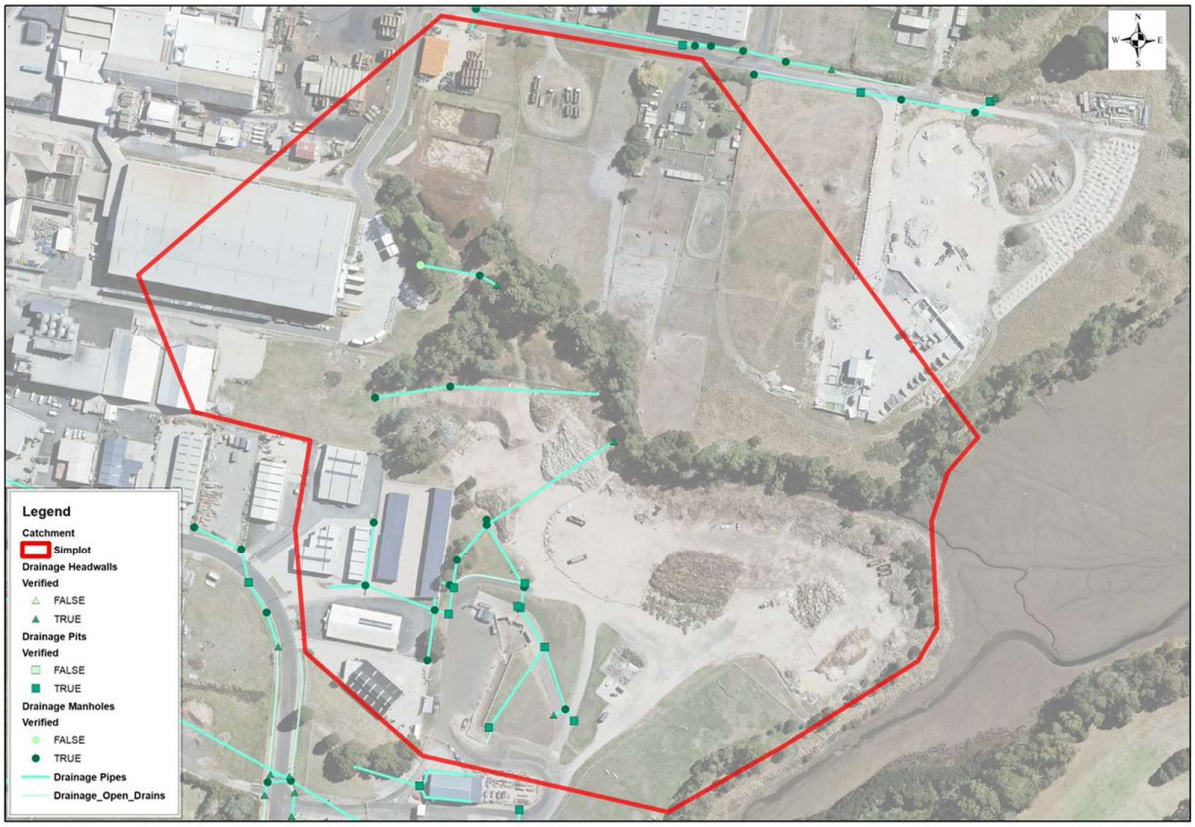
Approx. land area (ha)	32.77
Land use	Rural Resource & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.2EY (1 in 5 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.58 Catchment Sheffield 5



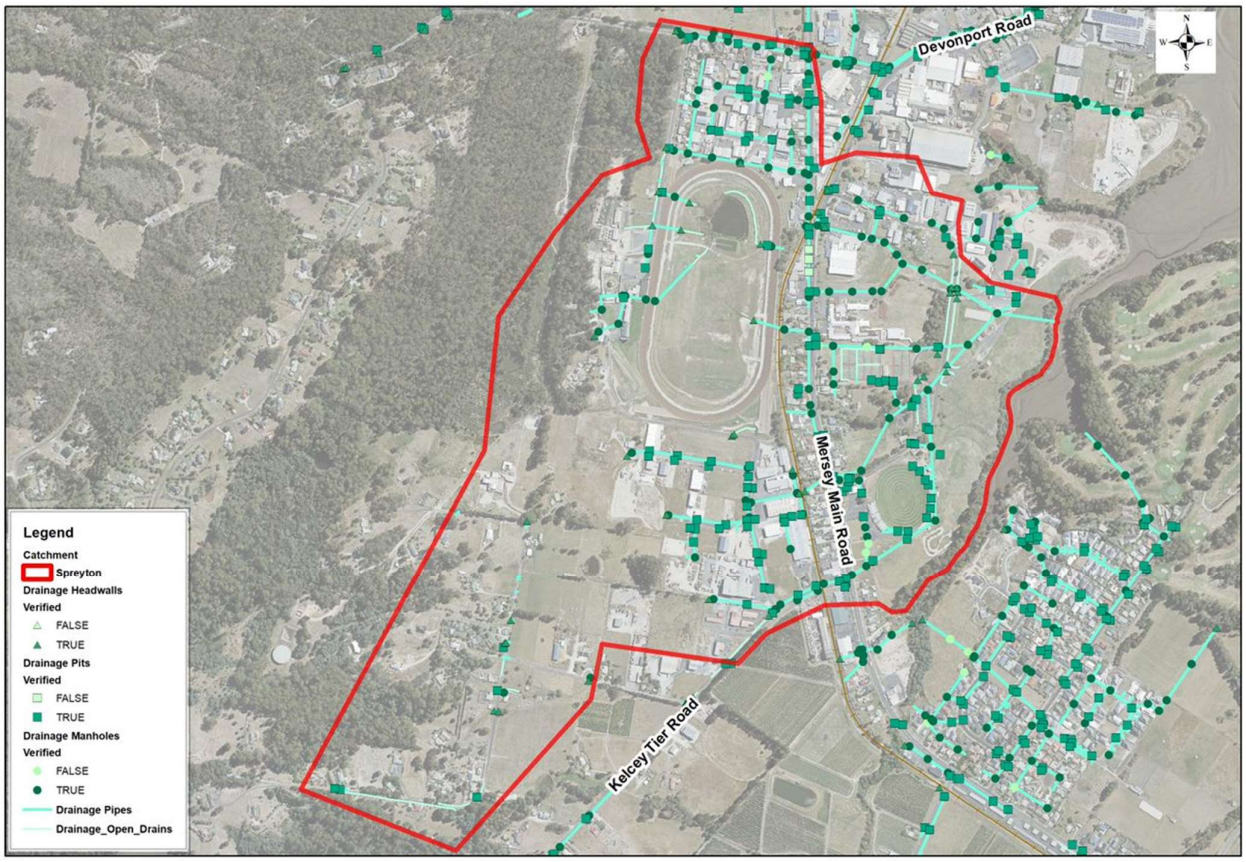
Approx. land area (ha)	24.46
Land use	Rural Resource & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	0.5EY (1 in 2 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.59 Catchment Simplot



Approx. land area (ha)	16.2
Land use	General Industrial & Utilities
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.60 Catchment Spreyton



Approx. land area (ha)	163.37
Land use	Light Industrial, Recreation & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.61 Catchment Steele

Approx. land area (ha)	19.89
Land use	Urban mixed use / Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

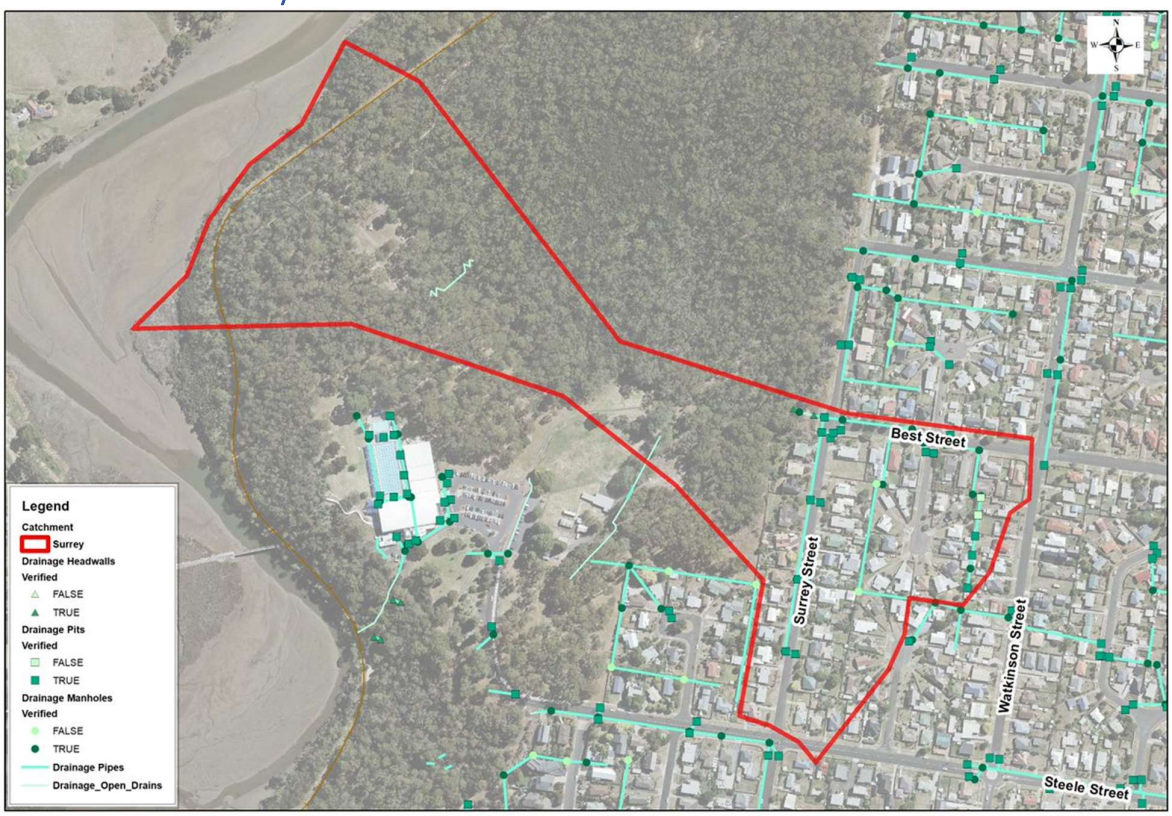
6.62 Catchment Stephen

Approx. land area (ha)	12.93
Land use	General Residential & Light Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.63 Catchment Stewart

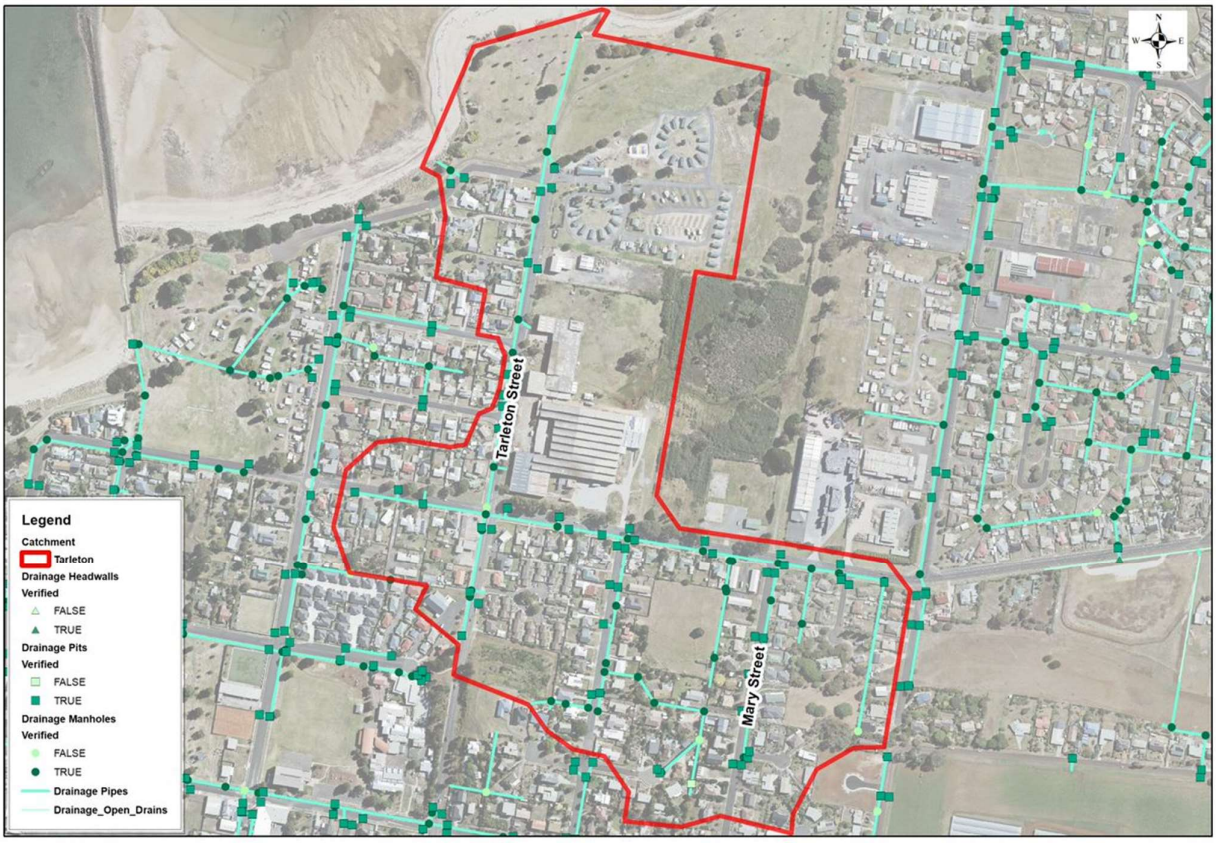
Approx. land area (ha)	5.35
Land use	Central Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	1EY (1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.64 Catchment Surrey



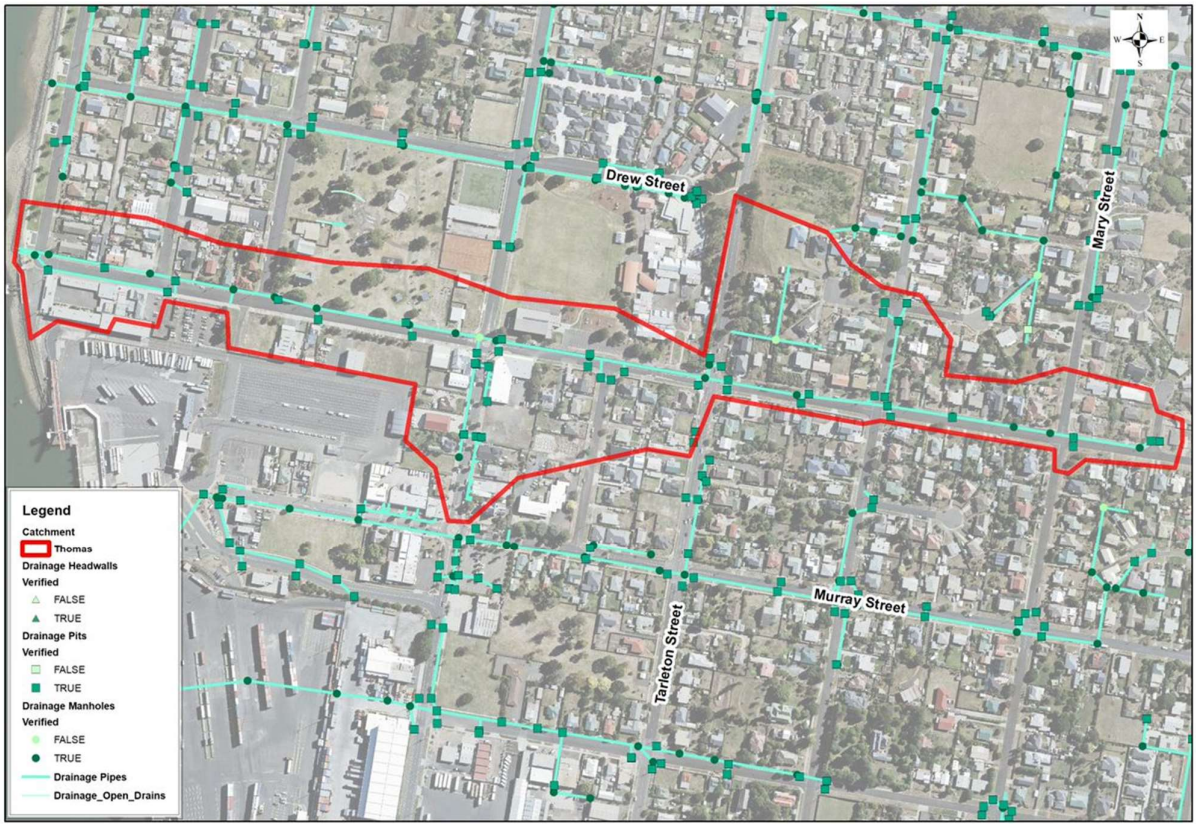
Approx. land area (ha)	16.61
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	1EY (1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.65 Catchment Tarleton



Approx. land area (ha)	34.74
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Medium

6.66 Catchment Thomas

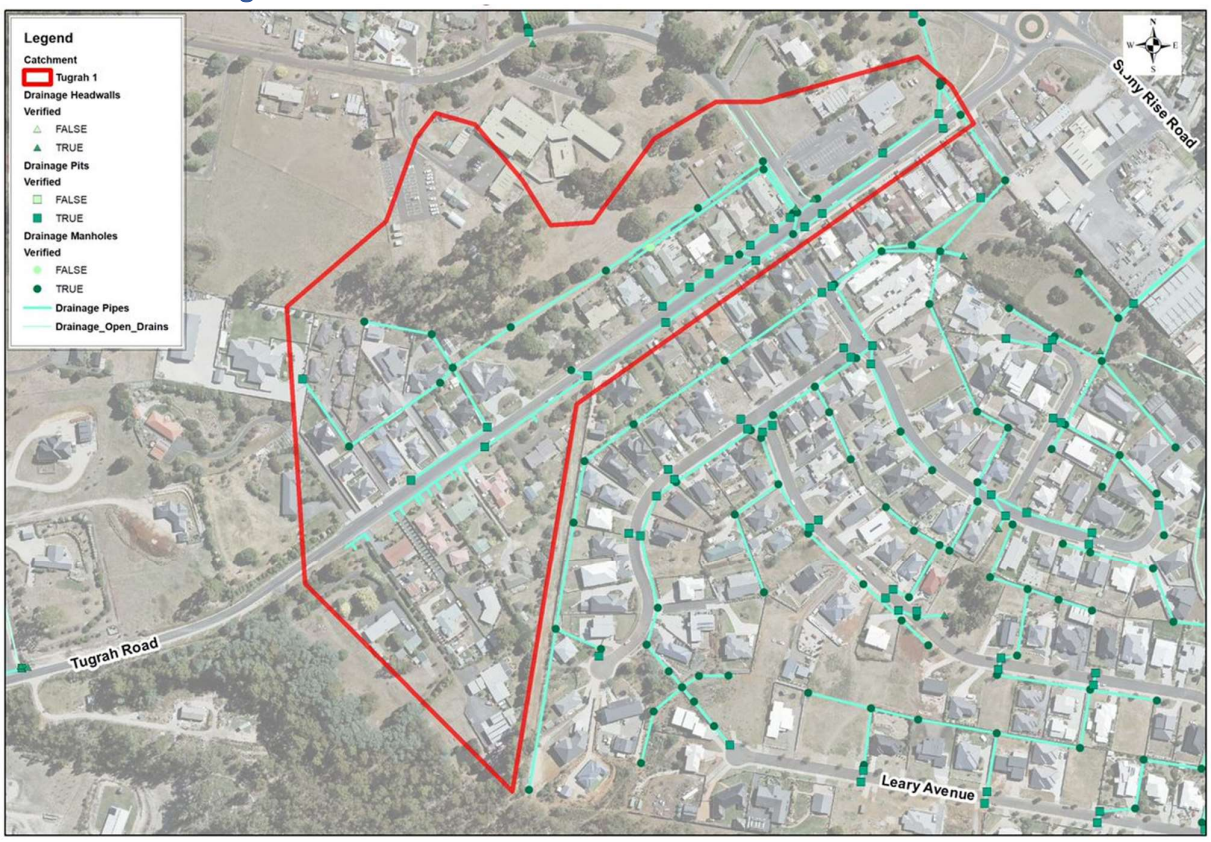


Approx. land area (ha)	13.79
Land use	General Residential / Local Business
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.67 Catchment Torquay

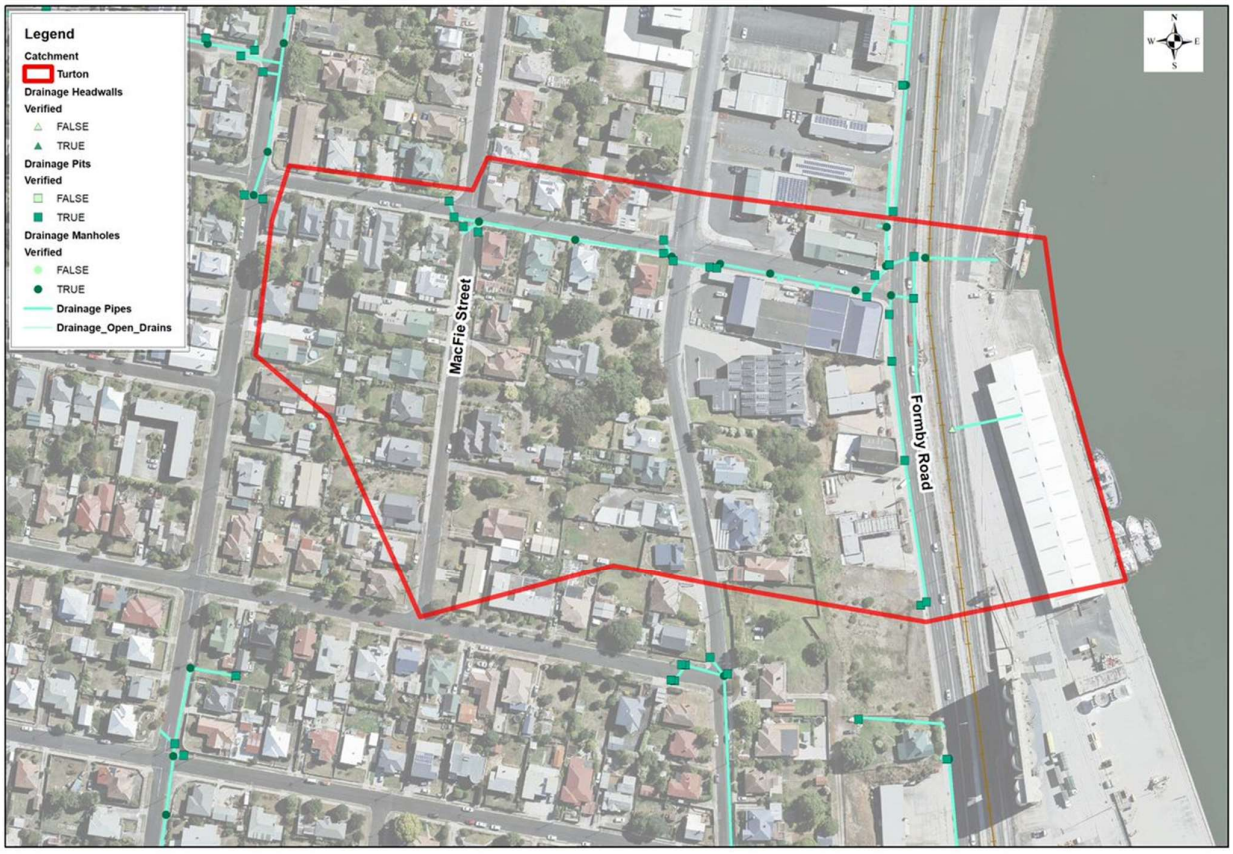
Approx. land area (ha)	42.75
Land use	General Residential / Light Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.68 Catchment Tugrah 1



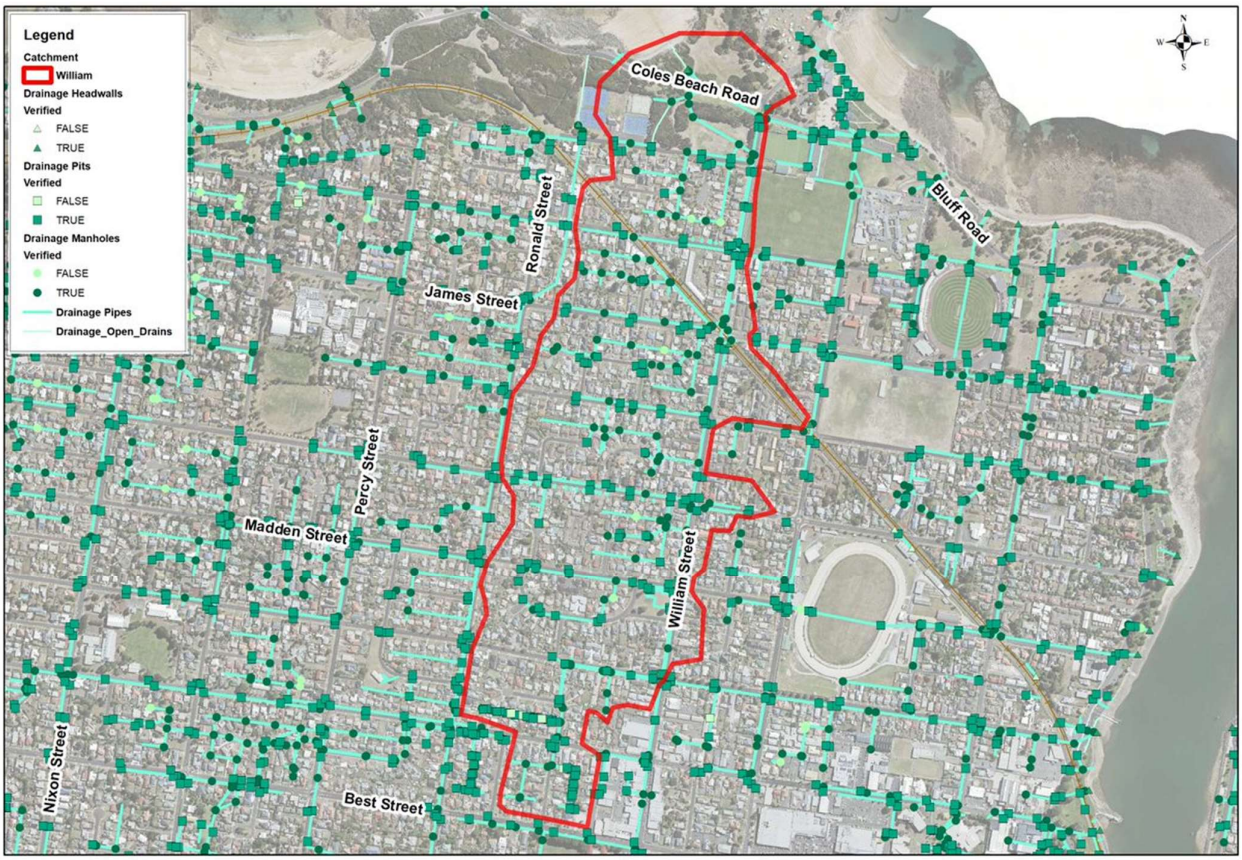
Approx. land area (ha)	10.06
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.69 Catchment Turton



Approx. land area (ha)	6.85
Land use	Urban mixed use & General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.70 Catchment William

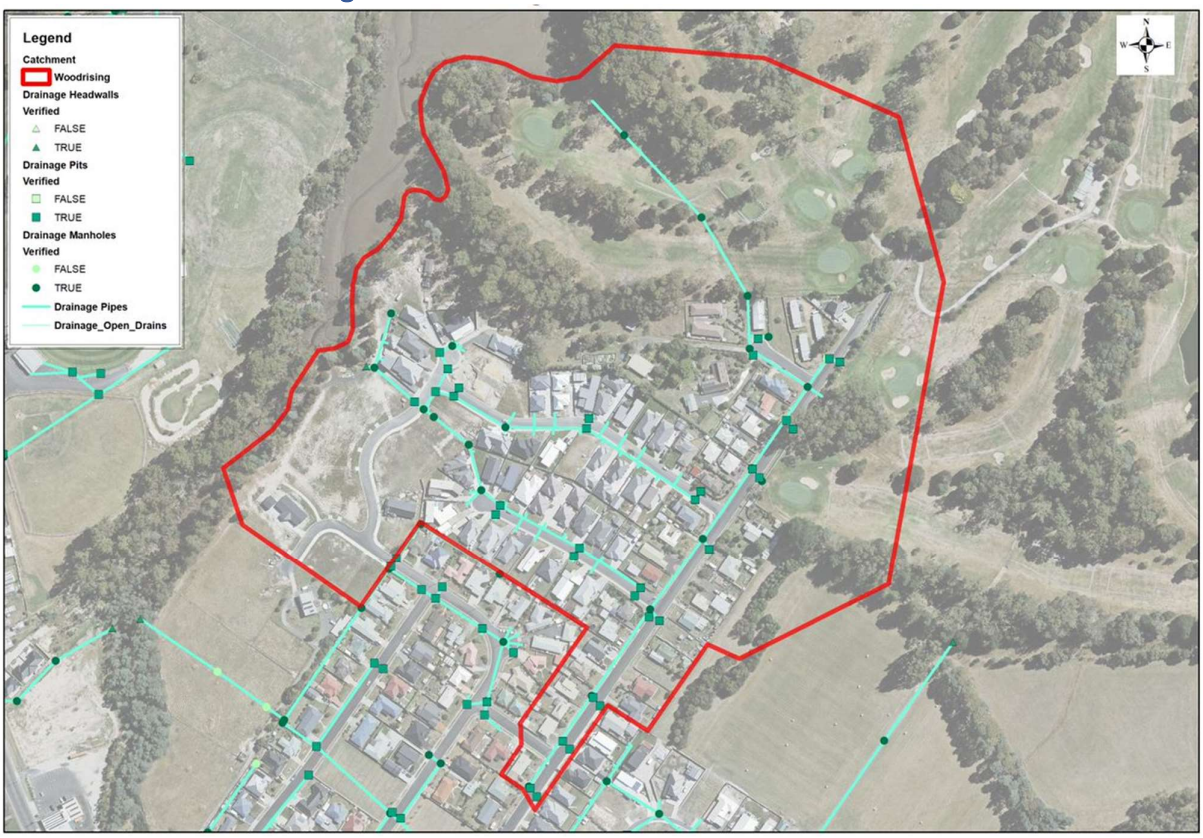


Approx. land area (ha)	64.67
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	High

6.71 Catchment Winspears

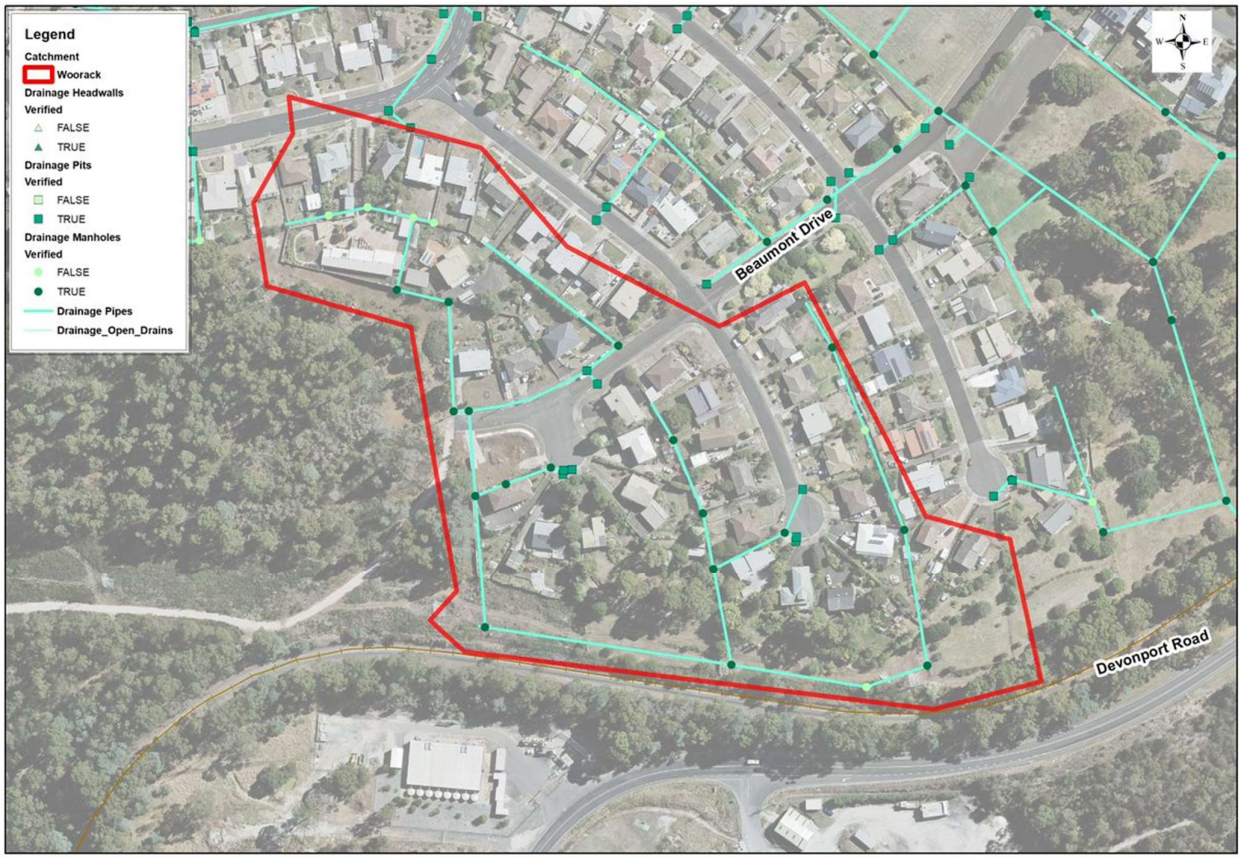
Approx. land area (ha)	26.85
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.72 Catchment Woodrising



Approx. land area (ha)	23.3
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	1EY (1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.73 Catchment Woorack



Approx. land area (ha)	5.31
Land use	General Residential
Hydraulic modelling undertaken	TBC
Nominal minor system capacity	TBC
Risk assessment undertaken	TBC
Risk Rating	TBC

6.74 Catchment Wright

Approx. land area (ha)	7.68
Land use	General Residential
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

6.75 Catchment Young

Approx. land area (ha)	6.03
Land use	Light Industrial
Hydraulic modelling undertaken	2019
Nominal minor system capacity	Less than 1EY (< 1 in 1 ARI)
Risk assessment undertaken	2019
Risk Rating	Low-Medium

7 Summary of risk assessments:

A summary of the risk ratings is shown in Table 7 below.

Risk Rating	Total Catchments	% Total
High	4	5%
High-Medium	0	0%
Medium-High	1	1%
Medium	9	12%
Low-Medium	45	60%
Low	0	0%
Not Classified (TBC)	16	21%
TOTAL	**75**	

Table 7: Summary of risk ratings

The catchments where a high risk from flooding to people or property are large urban catchments:

- Chinamans Creek
- Parker
- Ronald
- William

The risk rating of the stormwater catchments is displayed in map form in Figure 5 below.

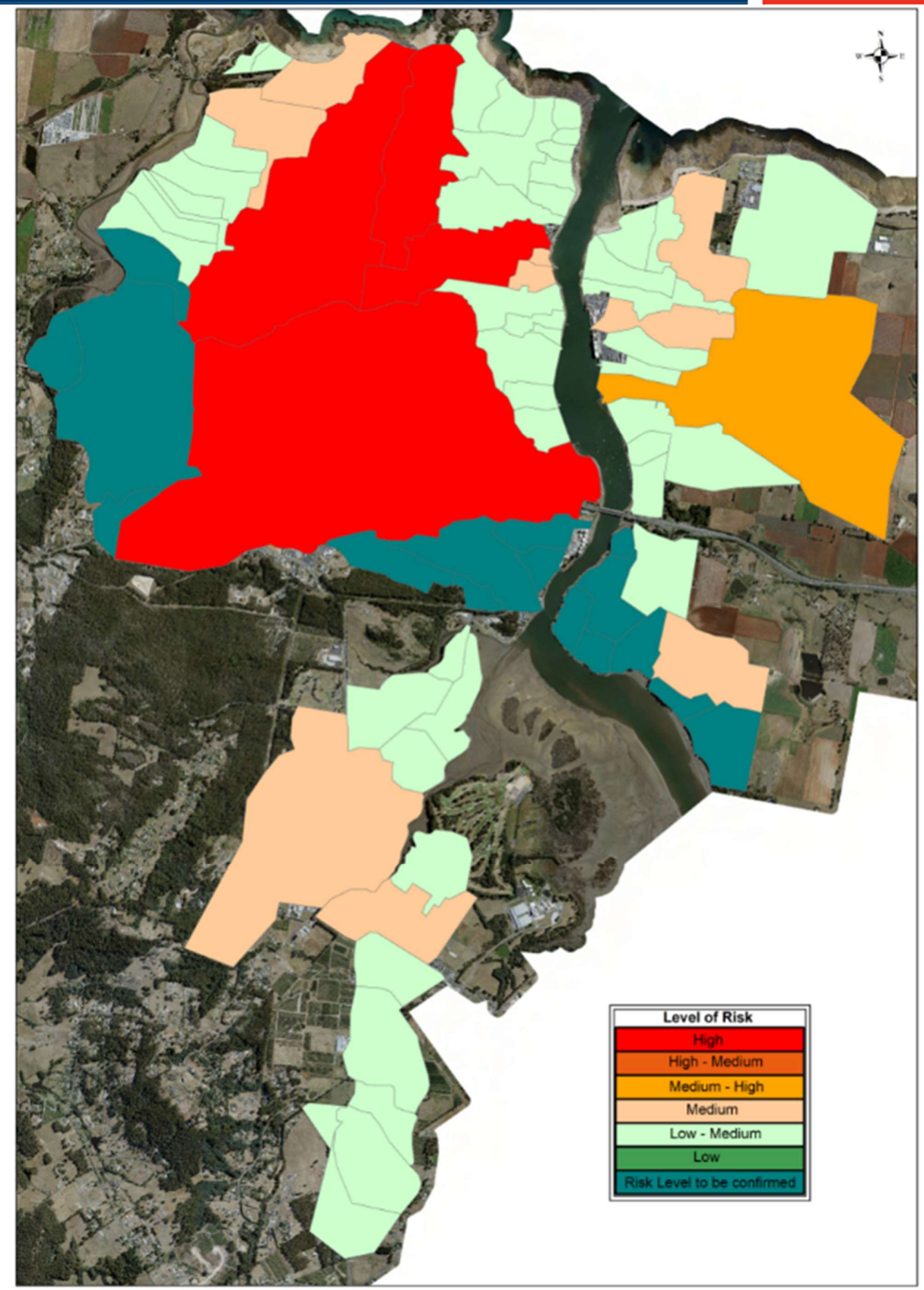


Figure 5: Catchment risk ratings

8 Action Plan:

The following items have been identified as priority and ongoing actions for the SSMP

8.1 Complete the hydraulic modelling for the remaining catchments

Resources will need to be allocated in the 2020-21 operational budget to complete survey, modelling and risk assessments for the 16 catchments yet to be assessed. Based on anecdotal evidence, it is unlikely that y of these catchments are high risk.

Catchment	Risk assessment planned
Penambul	2020/21
Miandetta	2020/21
Woorack	2020/21
Mungala	2020/21
Havelock	2020/21
Tugrah 1	2020/21
Aquatic	2020/21
Richardson	2020/21
Georgiana	2020/21
Enderly	2020/21
River1	2020/21
River2	2020/21
River3	2020/21
River4	2020/21
River5	2020/21
Greenbank	2020/21

8.2 Prioritise catchments based on risk assessment

This action is largely complete as the risk assessments have been competed for the majority of catchments.

8.3 Develop feasible concept plans

Commencing with the priority catchments, identification of 'hot spots' and development of solutions to address these will be required. Costs estimates will need to accompany concept plans

8.4 Update Forward Capital Works Program with priority projects

Existing allocations in the forward capital works program should be reallocated to priority projects. However, there will be circumstances where it will be opportune to deliver lower priority projects 'out of sequence' perhaps due to asset condition or combining risk reduction projects with other work.

If new funding allocations were required, then this would have to be considered within the constraints of the Stormwater AMP and the Long Term Financial Plan.

8.5 Maintain asset data, hydraulic models and risk ratings as stormwater network changes

Multiple projects each year create new stormwater assets and dispose of existing assets. Maintaining accurate asset data, hydraulic models and risk ratings ensure the correct catchments are prioritised.

8.6 Maintain hydraulic models and risk rating as storm intensities increase (as determined by AR&R)

The storm intensities in AR&R have major impact on the capacity of the system. It is likely that storm intensities will continue to increase due to the impacts of climate change, which reduces the ability of the stormwater system to handle that rain event.

Maintaining the hydraulic models and the risk assessments will ensure the correct catchments are prioritised.

8.7 Maintain relationship between SSMP and Stormwater AMP

The AMP will need to identify allocations for risk reductions projects, which are prioritised by the outputs of the SSMP.

9 Appendices:

9.1 Council Stormwater strategy – 2012 (Will be updated in 2020)

https://www.devonport.tas.gov.au/wpfd_file/stormwater-strategy-2012/

9.2 Council Forward Capital works Program 2019-2024

https://www.devonport.tas.gov.au/wpfd_file/forward-capital-works-program-2019-2024-2/

9.3 Determining existing system capacity procedure

The current capacity of the minor system is determined with how the stormwater system works as whole for each rainfall event. Ideally if no pipes are surcharging and there are no inlet capacity issues for the pits then the system is adequate for that particular rainfall event. However, applying this method to any DCC catchments would always end up resulting in the capacity being <1EY (Less than 1 in 1 ARI). This is primarily based the fact that the existing pits are small and there aren't enough of them to capture the water into the underground piped system, or in other instances the underground pipes are not big enough to accept the flow coming into them from the pits. There is no "one" pit that can capture all the inflow into the underground system. Some overland flow will bypass the upstream pit and another downstream pit would need to capture this additional flow into the underground piped system.

The adopted method in this instance to determine the current capacity for each catchment has been simplified and is based solely on the underground pipes not surcharging (hydraulic grade lines below surface levels). If 100% of the pipe network is not surcharging for a particular rainfall event, then this is the current existing capacity of the system. Note that this method is not perfect because if a stormwater network doesn't have enough inlet pits, then the underground system would perform well since there would be less water entering the piped system, making it appear the system is adequate. Some level of overland flow is always expected in any rainfall event and judgement is required to determine if the stormwater model has been setup to reflect realistic conditions it will experience. Note that the stormwater models are developed on the conservative side and calibration against a range of events is constantly required, which is an ongoing task.