



# Moreland

City Council



## Drainage

# Asset Management Plan 2020

Version 1.0  
July 2020

# Moreland City Council

## Drainage Asset Management Plan

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# **DRAINAGE ASSET MANAGEMENT PLAN**

## **1 EXECUTIVE SUMMARY**

### **1.1 Purpose of the Plan**

This plan provides a framework for the sustainable management of Council's drainage assets, in support of the Council Plan, Council's Asset Management Policy and Asset Management Strategy, and regulatory requirements.

This Drainage Asset Management Plan (DAMP) is structured along the lines recommended in the International Infrastructure Management Manual 2015 (IIMM).

### **1.2 Asset Description**

The assets covered by this plan include: stormwater pipes, culverts, open drains, pits, storm water treatment and retention features (WSUD – water sensitive urban design). These enable the transfer of local stormwater runoff away from private properties, roads and open space to the Melbourne Water drainage network, and ultimately the Merri or Moonee Ponds Creek.

### **1.3 Levels of Service**

Current design standards require that during a 1% AEP storm event, all runoff is contained within the underground drainage network or overland flow paths, such as along roadways between the kerbs (contained on the road reserve). Council has engaged consultants (Engeny) to determine locations where existing drainage infrastructure is insufficient to meet this standard.

Proactive work is undertaken by the Street Cleansing Unit to reduce the likelihood of blockages causing flooding. This work comprises of:

- Street cleaning (local roads are swept every 6 weeks; this reduces the amount of debris entering the pipe network and causing blockages)
- Pit inspections including quick removal of debris on a regular basis; a 2 year schedule is currently being undertaken and will be monitored to assess its viability.

A small number of pits (10 to 20) are currently being inspected on a more regular basis; these pits have been identified based on a review of historical service records of frequent blockages and the flood mapping data of potential flooding areas. (This review is ongoing).

Locations which may be at a high risk of flooding are being determined through historical service records of frequent blockages in conjunction with the flood mapping data. Service levels appropriate to these locations need to be established.

Additional reactive cleaning and inspections are carried out in response to significant issues identified by proactive inspections and by the public, within available resources. This additional work comprises of

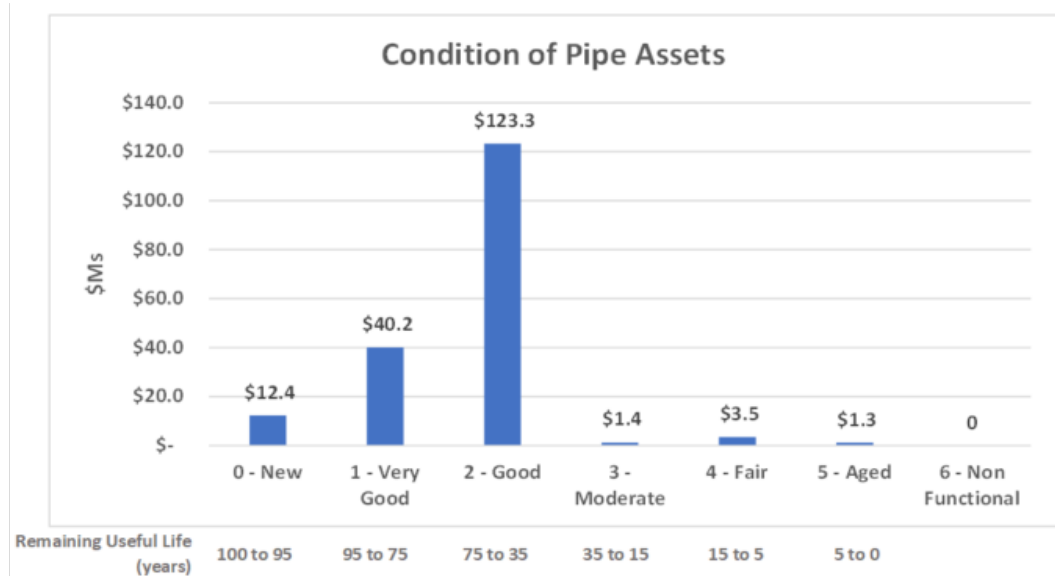
- Additional street sweeping in problem areas
- Removal of pit debris by mechanical means
- Inspection of drains using cameras by MCC staff
- Camera inspections (including a report) by contractors
- Cleaning of pipes by contractors

The locations and results of CCTV investigations are maintained in Content Manager.

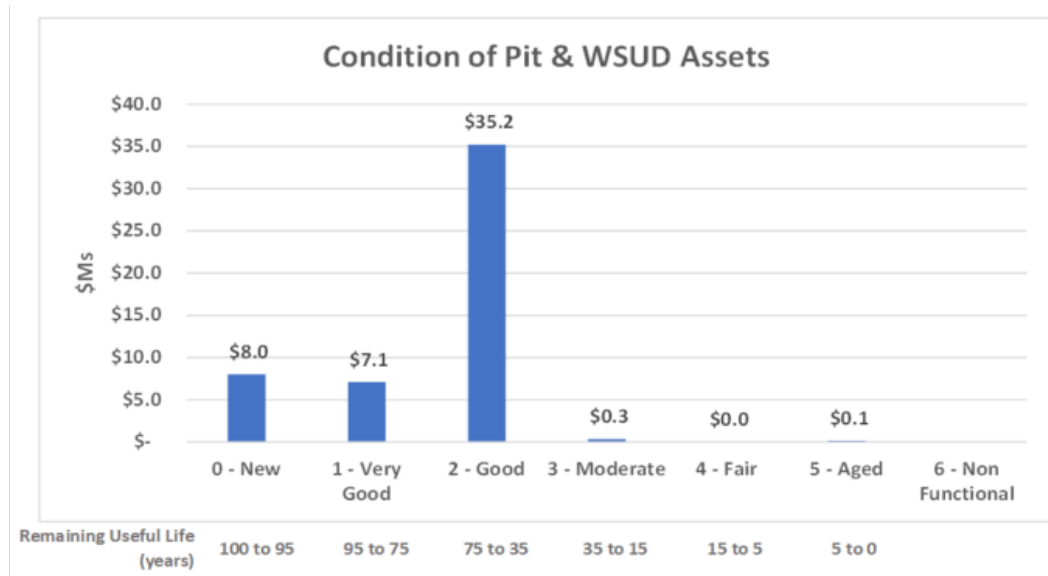
## 1.4 Renewal Funding Projections

The assessment of asset condition of any Council's drainage network is challenging, as the assets are buried, the use of CCTV cameras is expensive and the results imprecise. Generally, pipes are valued based on age rather than directly on condition, and CCTV coverage of the network is undertaken only where diminished drainage performance has become evident.

The modelled condition of Council's drainage pipes is show below.



The modelled condition of Council's drainage pits & WSUD's is shown below.



Council's current practice is to upgrade (i.e. partial renewal of) drainage assets in two ways: -

- a. as drainage projects based on known areas of substandard drainage performance, independent of other works (2019/20 budget – \$1.09M)
- b. as a component of a road reconstruction project. (2019/20 estimated expenditure \$2.8M)

An additional \$50,000 is provided for design.

Drainage asset failures (i.e. renewals) are addressed using the following: -

- a. CCTV surveys (2019/20 - \$90,000) to scope the works;
- b. drainage capex reactive budget (2019/20 - \$0.23M)

In view of the challenges of accurately determining which pipes are nearing the end of their useful life across the whole network, this approach is deemed to be the most practical use of funds.

### **1.5 Plans for the Future**

In 2017/18 Council engaged consultants, Engeny, to carry out a hydraulic and hydrologic analysis across the municipality, to assess the performance of Council's drainage network. The analysis is being carried out in 2 stages; -

- Stage 1 – Undertake flood modelling within Moreland to produce flood extent at 1, 5, 10 and 20% AEP (Annual Exceedance Probability) and identify the worst affected flooding areas within the municipality. This has included modelling of climate change impacts;
- Stage 2 – Determine and prioritise the mitigation works and associated cost to address flooding hazards to reduce risk to the community (for 10% AEP).

Of the hotspots identified for a 10% AEP, Council has identified 42 for further investigation. A further assessment is currently being undertaken to assess flood mitigation opportunities on these 42 flooding hotspots to inform / develop a Drainage Improvement Strategy.

The flood modelling is also proposed to form the basis of a Planning Scheme Overlay (Special Building Overlay) to control development within flood prone areas through the planning process.

### **1.6 Climate Change**

Climate change raises the likelihood of extreme events, e.g. prolonged drought, higher temperatures and significant storm/rainfall events.

Currently there are many locations within Moreland which do not meet the desired service level of Section 1.3 - a 1% AEP storm event, where all runoff is contained within the underground drainage network or overland flow paths, such as along roadways between the kerbs (contained on the road reserve). These locations are being addressed within budgetary constraints through the drainage construction and road construction program. The design calculations which determine discharge rates and pipe sizes, are based on the latest 1% AEP storm events from the Australian Rainfall & Runoff Guidelines.

A further result of climate change may be the drying out (or wetting up of the earth). This may damage drainage pipes. No prediction of the severity of this effect has been made in this document. Any works which will be required will be on a reactive basis. There is no occasion of this having occurred as yet; hence no proposed budgetary allocation has been made at this stage. This may need to be addressed in future revisions of this document.

## 2 INTRODUCTION

This Drainage Asset Management Plan has been compiled to

- document existing maintenance practices
- demonstrate responsive management of assets
- to communicate funding required to maintain the existing drainage asset portfolio, and
- record the need to undertake works to upgrade the drainage network.

### 2.1 Drainage Assets and Classifications

The role of Council's drainage network is to drain stormwater away from Council and private properties, roadways and open space in a timely and efficient manner, thus minimising adverse effect on property and public health.

Council's drainage pipes are connected to Melbourne Water assets, comprising natural water courses and major drainage pipelines. The drainage lines are located within road reserves, within Council property or within easements on private property. Maps of these assets are presented in the Appendices.

- Appendix A – Melbourne Water Drainage Network
- Appendix B – Moreland Council Drainage Network
- Appendix C – VicRoads Drainage Network

VicRoads are responsible for drainage pits/pipes that only drain surface runoff from the declared arterial road network, and are often connected to Council's drainage network. The demarcation between Council and VicRoads drains is detailed in the VicRoads 2017 Code of Practice - Operational Responsibility for Public Roads. A diagram showing the demarcation between Council and VicRoads assets has been reproduced from the Code of Practice and is provided in Appendix D. This diagram provides improved clarification of ownership of assets; Council's drainage database needs to be reviewed to ensure accurate drainage asset ownership have been recorded.

It should be noted that VicRoads has engaged Council to undertake street sweeping of all arterial roads. This is done on a daily basis, thus reducing debris which might otherwise enter and block VicRoads and Council's drainage network.

The amount of stormwater discharge in any part of the network determines the significance of that part of the network. This discharge also determines the pipe size. No separate hierarchy has been assigned as the significance of any part of the network is reflected by the maximum pipe size.

Drains within the road reserve from private property (ie. house drain connections), remain the responsibility of the land owner until they feed into a Council drain, pit or kerb and channel.

Table 2.1 Assets covered by this plan

Asset Category	Quantity	Unit	Replacement Value	% of Total
Pipes	552	km	\$182.2M	78.2%
Pits	2,200	no.	\$50.4M	21.6%
Stormwater Treatment / Retention Assets (WSUD – water sensitive urban designs)	178	no.	\$0.4M	0.2%
		<b>Total</b>	<b>\$233.0M</b>	

## 2.2 Utilisation of Drainage Assets

The design standard for Council's drainage network is the 1% AEP storm event; typically 10-20% AEP for the underground drainage network and 1% AEP for overland flow paths. With the various diameters of installed pipe across the drainage network, pipe capacity may be greater than required in some locations, however the flood modelling has indicated that pipes are also undersized in a number of areas, or overland flow paths are restricted requiring greater pipe capacities than the typical 10-20% AEP.

## 3 LEVELS OF SERVICE

### 3.1 Customer Research and Expectations

An annual survey is carried out asking Moreland's residents to rate their satisfaction with various local government services. However, drainage performance is not addressed, as issues are generally very localised and may more-so relate to areas of Melbourne Water responsibility as identified in the 2018 Flood Modelling.

### 3.2 Risk Identification

An efficient effective drainage network reduces the risk of properties, especially dwellings, being flooded. The Moreland Flood Mapping & Modelling Project Report from Engeny (consulting) indicates that in several areas within Moreland City, the flooding risk may need to be addressed.

A risk analysis has been carried in accordance with Council's risk assessment methodology (see Appendix E), and considers the effects of the following: -

- an improved drainage network
- adoption of the Planning Scheme Overlay
- current proactive maintenance practices

Based on existing drainage network conditions, considering both the 1% and 10% AEP storm events, the risk to Council could be described as medium. By implementing drainage improvement works recommended in the Engeny report, the risk could be reduced to low. This is indicative, and is dependent on timing and funding requirements.

A reduction of the impact of the 1% AEP storm within Moreland will be achieved by the Planning Scheme Overlay (Special Building Overlay 2) which identifies

- 1% AEP flood levels with required freeboard

- Drainage Flow Paths which are to be not obstructed

The risk of new development flooding could be reduced from medium to low risk.

Drainage pits are inspected and cleaned on a 2 yearly cycle. This proactive maintenance has lowered the risk from medium to low.

The effect of development on the impact of lower intensity storms is also currently managed by drainage design criteria. This ensures that where there is a significant increase in stormwater runoff from a property; suitable runoff storage / retention is provided.

### 3.3 Current Levels of Service

In determining appropriate levels of service for road assets Council has considered the following: -

- stewardship responsibility to maintain the existing condition of the assets in the long term (for the next generation)
- risk minimisation responsibility to ensure that any risk associated with the performance of a drainage asset is reduced to an acceptable level.

Hence the following maintenance regime has been adopted: -

Activity	Frequency
Pit Inspection and Manual Clean – Standard Locations	every 2 years
Pit Inspection and Manual Clean – High Risk Locations	to be reviewed
Street Sweeping	every 6 weeks
Mechanical Pit Cleaning	as required
Camera (CCTV) Investigation	as required
Contractor Drain Cleaning	as required

A summary of the pipes (and locations) where CCTV results have been obtained is maintained in Content Manager, document no. D11/179008 – CCTV Jobs Register.

The individual results are also contained in Content Manager under:

#### **Classification / Drainage / Drainage-Inspections**

To prevent isolated blockages causing localised flooding, Council's Street Cleansing Unit has in place emergency procedures (e.g. after hours call outs for sand bagging residences and pumping stormwater around blockages) to minimise property damage.

In addition to maintenance, Council provides a capital budget of \$260,000 (2020/21) to either; -



- a. renew pipes and pits whose performance is poor due to defects or failure.
- b. carry out low cost drainage upgrades to address local issues

Further upgrades and expansion to the drainage network are carried out as either stand-alone drainage projects or part of road reconstruction projects. The value of this work in 2019/20 was \$3.85M .

### 3.4 Current Funding Levels

Current Operating and Capital funding levels relating to drainage assets are as follows: -

	2019/20	2020/21	2021/22	2022/23	2023/24
<b>Drainage Maintenance</b>					
• Street Sweeping	\$0.97M	\$0.98M	\$0.99M	\$1.00M	\$1.01M
• Drainage Maintenance	\$0.37M	\$0.37M	\$0.37M	\$0.38M	\$0.38M
<b>Sub total</b>	<b>\$1.34M</b>	<b>\$1.35M</b>	<b>\$1.36M</b>	<b>\$1.38M</b>	<b>\$1.39M</b>
<b>Drainage Planning</b>					
Drainage Investigation / Design	\$0.05M	\$0.05M	\$0.05M	\$0.05M	\$0.05M
Drainage Survey by CCTV	\$0.09M	\$0.05M	\$0.05M	\$0.06M	\$0.06M
<b>Sub total</b>	<b>\$0.14M</b>	<b>\$0.10M</b>	<b>\$0.10M</b>	<b>\$0.11M</b>	<b>\$0.11M</b>
<b>Drainage Renewals</b>					
Drainage Reactive Program	\$0.16M	\$0.20M	\$0.20M	\$0.20M	\$0.20M
Drainage Renewals – Pits	\$0.07M	\$0.10M	\$0.10M	\$0.10M	\$0.10M
<b>Sub total</b>	<b>\$0.23M</b>	<b>\$0.30M</b>	<b>\$0.30M</b>	<b>\$0.30M</b>	<b>\$0.30M</b>
<b>Drainage Upgrade / Expansion</b>					
Drainage Projects	\$1.09M	\$1.12M	\$1.19M	\$1.46M	\$1.32M
Drainage Component of Road Construction (34% of budget)	\$2.76M	\$2.67M	\$2.76M	\$2.80M	\$2.62M
<b>Sub total</b>	<b>\$3.85M</b>	<b>\$3.79M</b>	<b>\$3.95M</b>	<b>\$4.26M</b>	<b>\$3.94M</b>
<b>Grand Total</b>	<b>\$5.56M</b>	<b>\$5.54M</b>	<b>\$5.71M</b>	<b>\$6.05M</b>	<b>\$5.74M</b>

## 4 FUTURE FUNDING CONSIDERATIONS

### 4.1 Existing Expectations

Current design standards require that during a 1% AEP storm event, all runoff is contained within the underground drainage network or overland flow paths, such as along roadways between the kerbs (contained on the road reserve).

The hydrology study undertaken in 2018 by Engeny Consulting has identified a significant number of areas in which this is not achieved (refer to their report). The cost to address these locations through physical drainage upgrades even in the medium term (over the next 10 years) is prohibitive, as well as being reliant on the upgrade of Melbourne Water main drains.

Council has commissioned further analysis and identification of problem areas based on a 10% AEP storm event, to determine and prioritise the mitigation works, with associated cost, to address these more frequent flooding issues. This report along with public consultation is still in development.

## **4.2 New Assets from Growth**

The new assets are provided (gifted) to Council by subdividers as required by the conditions in the Plan of Subdivision. The design standards required for these assets are based on MCC Technical Notes (available through Council's website). Generally, where a subdivision causes an increased runoff (due to an increase in impermeable surfaces), on site detention / retardation is required so that peak flow rates are not increased in order to avoid putting extra burden on Council's drainage network.

## **4.3 Climate Change Adaption**

Budget forecasts due to any damage to drainage pipes caused by climate change has not been included in this document. The works will be reactive and at present there are no incidents on which to base any predictions. Future revisions of the asset management plan may be able to address this.

Council adopted the Integrated Water Management (IWM) Strategy 2040 in Aug 2020, this sets the new direction for Moreland to transition closer towards the attributes of a water sensitive city. Allowing new industry approaches to water (including stormwater), Council water priorities and latest industry learnings to influence the development of new drainage and IWM targets, priority projects and clearly articulate a new five-year IWM Action Plan.

The IWM Strategy brings together all elements of the water cycle, including stormwater, to achieve the greatest social, economic and environmental benefits for the community. Taking an integrated approach ensures that the water cycle is more resilient to the impacts of climate change and a growing population, while continuing to make Moreland a great place to live, work and play.

This strategy enables optimum health of canopy trees and other vegetation even in drier times; cleaner drainage systems and less polluted waterways; less localised flooding that supports biodiversity; improves health and wellbeing of community; liveability and amenity; and making the city more adapted and resilient to heatwaves and other weather extremes.

In terms of adaptation to the inevitable consequences of climate change, including storm events of increasing frequency and intensity, IWM tools, such as WSUD assets, form part of the drainage network to assist in this adaptation.

As part of the five-year action plan of IWM Strategy 2040, there is a focus on identifying harvesting and retention potential, and investigating blue and green infrastructure to increase amenity, improve water quality and at the same time mitigate flooding. Below are a few actions that are targeting flood mitigation specifically in the Action Plan:

- Action 1.10: Develop rolling IWM implementation and delivery plan (detailed, costed and prioritised) with consideration to flood mitigation
- Action 2.3: Continue to upgrade Council's stormwater drainage network to meet 20% average exceedance probability levels of service
- Action 2.4: Consider flood management opportunities when planning WSUD and IWM (e.g. integrating stormwater harvesting with smart tank technology or water for biodiversity with flood mitigation)

As part of climate change adaptation, IWM tools, such as WSUD assets, need ongoing operation and maintenance. At this stage, based on the Action Plan, a full audit of WSUD assets to verify all existing WSUDs and the state of these assets will be provided by financial year 21-22. The WSUD Asset Management Plan will then be developed following completion of an audit as an amendment to this Drainage Asset Management Plan.

## 5 LIFECYCLE MANAGEMENT PLAN

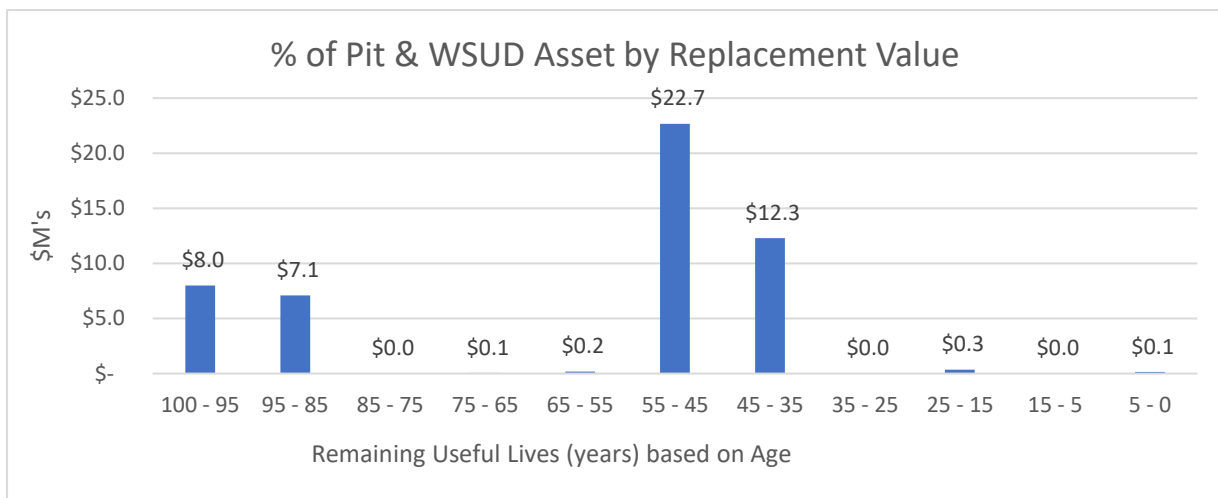
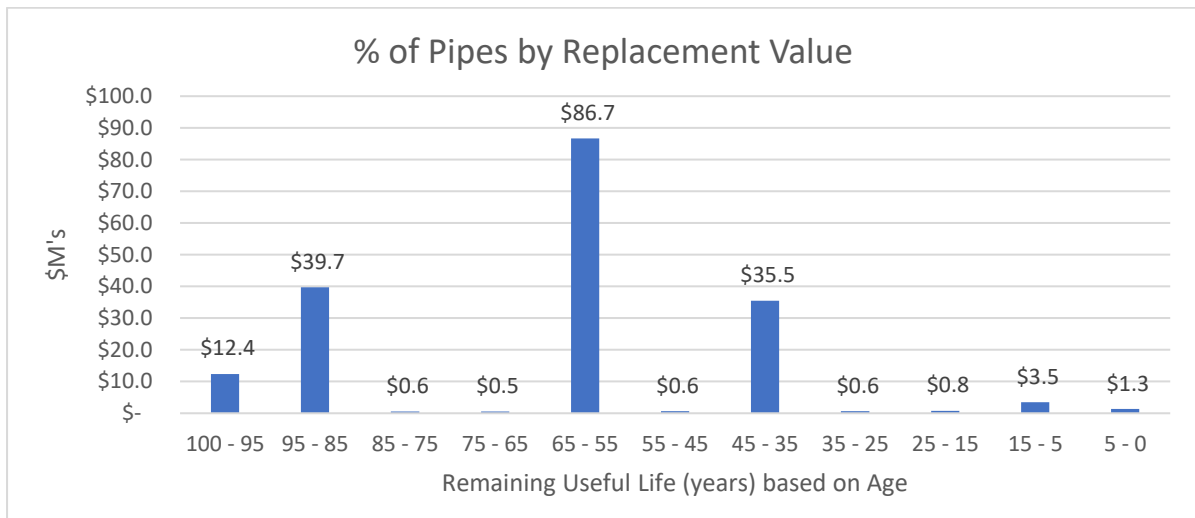
In order to manage Council's drainage network, Council has in place a drainage asset management database (Assetic), and a Geographic Information System; the database and GIS enable:

- All drainage assets to be recorded and mapped;
- Valuation of assets (based on age) for financial reporting;
- Inspections to be programmed and results recorded against the asset (to be developed);
- The programming and completion of works (to be developed).

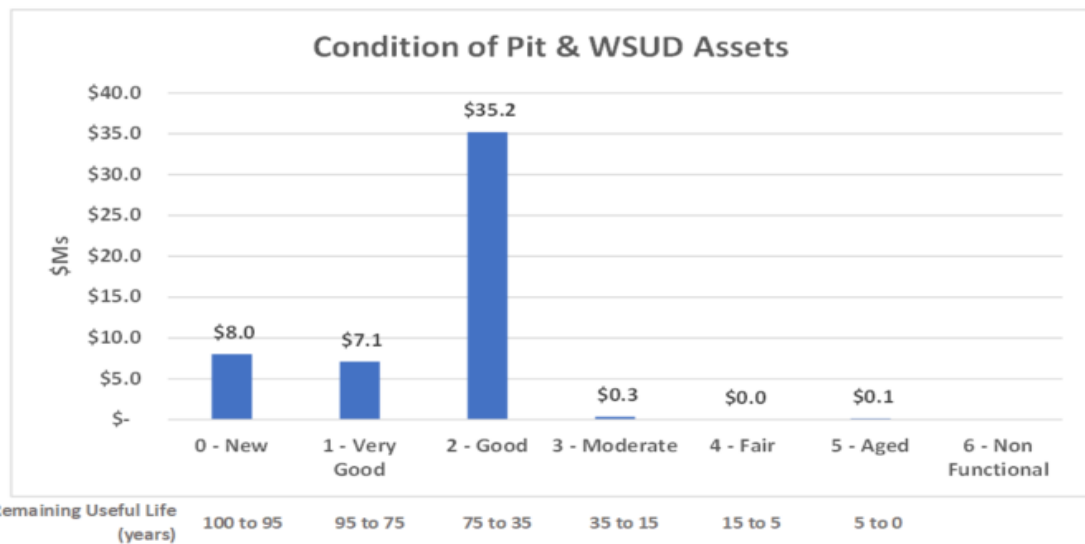
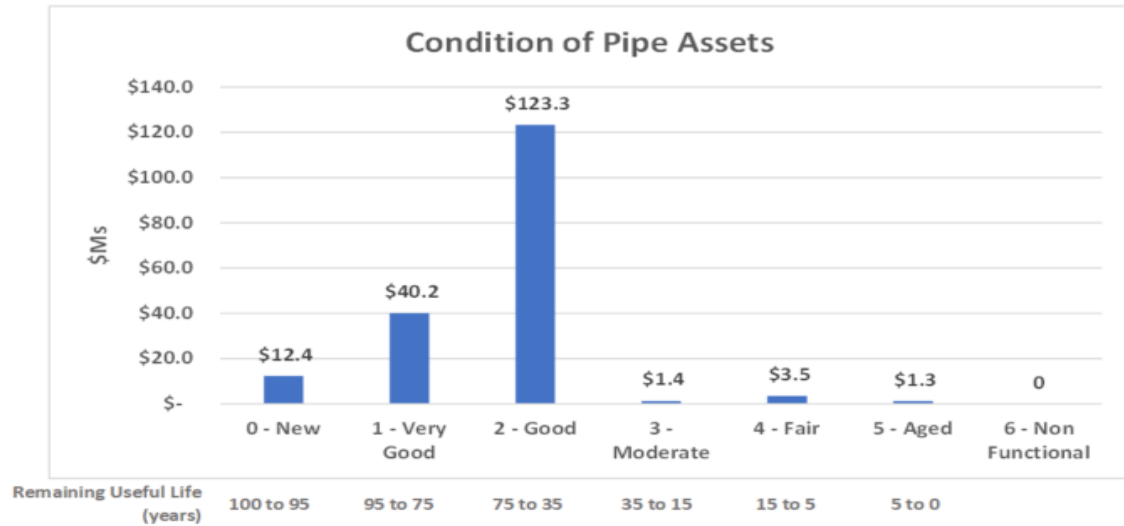
Currently CCTV inspection data is kept within Council's Corporate Records Management System.

### 5.1 Drainage Renewals

Graphs showing the remaining useful lives of MCC drainage assets are presented below. These graphs are based on estimated age of the assets.



The above graphs are re-presented below in a condition based scale of 0-6, consistent with other asset classes within the Assetic asset register.



These graphs indicate that a very high percentage of Council's drainage assets have a significant remaining useful life. The analysis also supports Council's current renewal funding level of \$1.43M over the next 5 years. Renewal projects are chosen where there is a history of poor drainage performance and where there is evidence of asset failure.

Because of the difficulty (expense and accuracy) of accurately determining pipe condition, it is not practical to identify individual ageing pipes and develop a program of works to renew those pipes before they reach the end of their life. Renewals should be carried out only where asset failure is evident from the performance of the drain and CCTV footage. Hence the development of a Condition Assessment Manual for the drainage network is not recommended as a required improvement in this plan.

## 5.2 Maintenance Works

Council's drainage maintenance is carried out by Council's own Street Cleansing Unit, supplemented by specialised contracting resources as required. Current and projected funding levels are outlined in Section 3.4.

## 5.3 Improvement Works

As part of every road reconstruction project, the drainage performance of the area is assessed. This assessment includes the following: -

- An initial review of drainage performance through reported events and the Engeny hydraulic report
- Identification of existing assets in the vicinity of the project
- CCTV inspection of the pipes to determine existing defects
- A hydrology analysis to determine runoff and flow patterns

The results of this assessment determine if drainage upgrade and renewal works are to be included in the project scope.

Furthermore, the report commissioned from Engeny (consultants) will identify and scope a number of projects to address the under-capacity of Moreland's drainage network for consideration in future Capital Works budgets; when these are addressed, Council's risk exposure should reduce.

#### **5.4 Nuisance Flooding**

In some streets where there is no underground drainage network, nuisance flooding occurs. This is characterised by regular ponding of water, which is a constant irritation to residents, although it may not be identified by the Flood Mapping study as there is little risk of flooding private property. The cost of rectification may be in the order of \$30,000 to \$50,000 per site. Due to budget constraints, these local sites / issues are infrequently addressed, but are however prioritised as part of the Reactive Drainage Program.

## 6 PLAN IMPROVEMENT

### 6.1 Improvement Plan

The asset management improvement plan generated from this Asset Management Plan is shown in Table 6.1.

**Table 6.1 Improvement Plan**

Item	Action	Responsibility
6.1.1	Review Engeny's Hydrologic & Hydraulic Analysis to provide a recommendation to Council to address flooding issues.	Engineering Services Coordinator
6.1.2	Prepare a long term drainage upgrade program for inclusion into the Capital Works program based on Council's decision (above).	AM Co-ordinator
6.1.3	Review the annual reactive capital works budget for addressing pipe defects and failures	AM Co-ordinator
6.1.4	Review the backlog of nuisance flooding issues and seek additional funds as required as part of the budget process.	AM Co-ordinator
6.1.5	Continue the development of the AM system to assist with programming proactive works and record completed works associated with drainage assets	AM Systems Administrator
6.1.6	Utilise GIS mapping to readily identify pipes where CCTV inspections have been done.	AM Spatial Officer
6.1.7	Review the recorded ownership of VicRoads' drainage assets and Council drainage assets to ensure consistency with the details provided in VicRoads 2017 Code of Practice	AM Spatial Officer
6.1.8	Review of pits which require cleaning / maintenance more frequently than every 2 years.	Unit Manager – Street Cleansing

### 6.2 Monitoring and Review Procedures

The progress of actions plan will be monitored via Council's Service Unit Plan process and Asset Management Steering Committee.

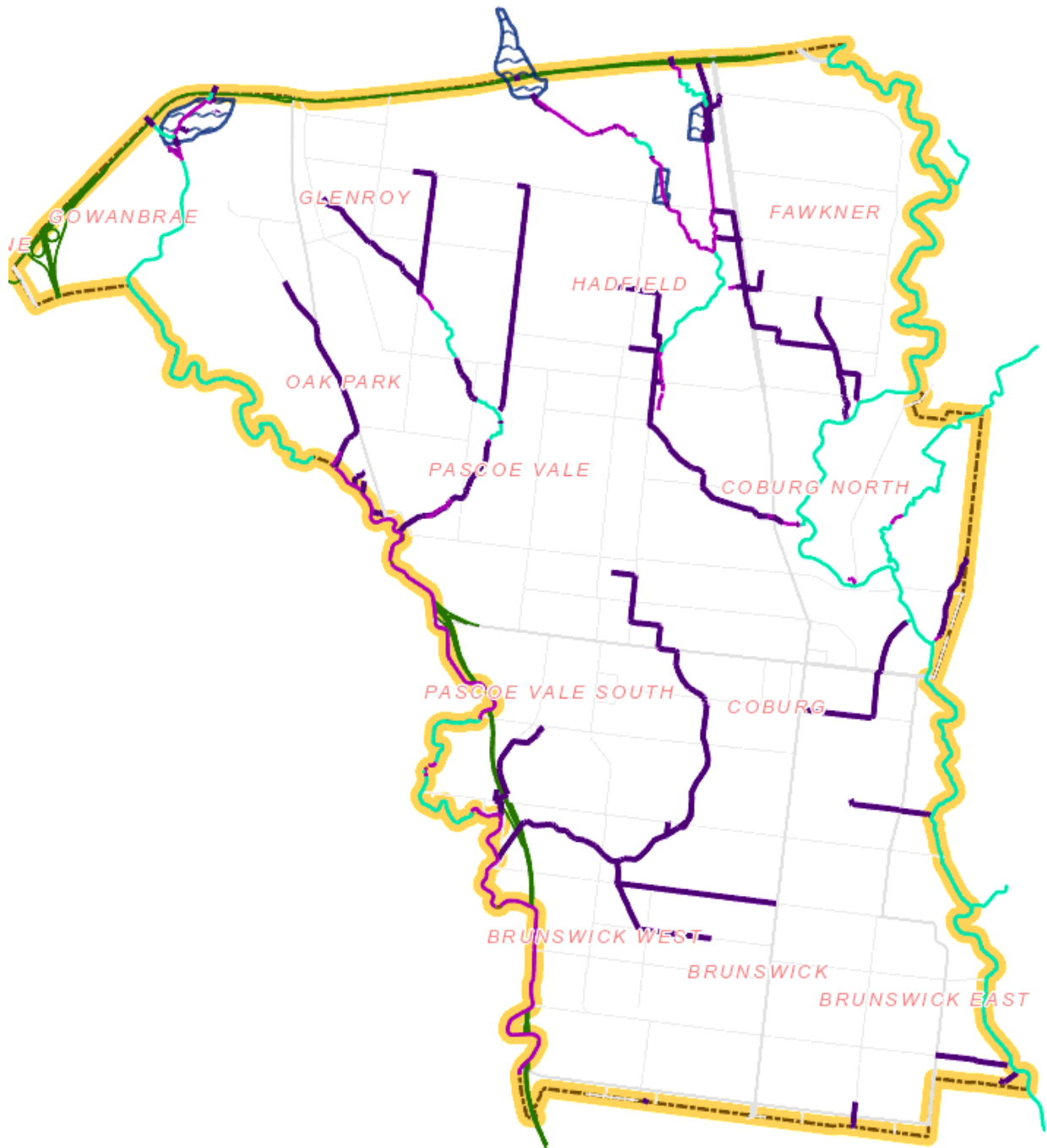
This Drainage Asset Management Plan will be reviewed in 2024/25.

## 7 REFERENCE DOCUMENTS

In 2017/18 Council engaged consultants, Engeny, to carry out a hydraulic and hydrologic analysis across the municipality, to assess the performance of Council's drainage network. Reports from Engeny have been recorded in Council's document register (CM): -

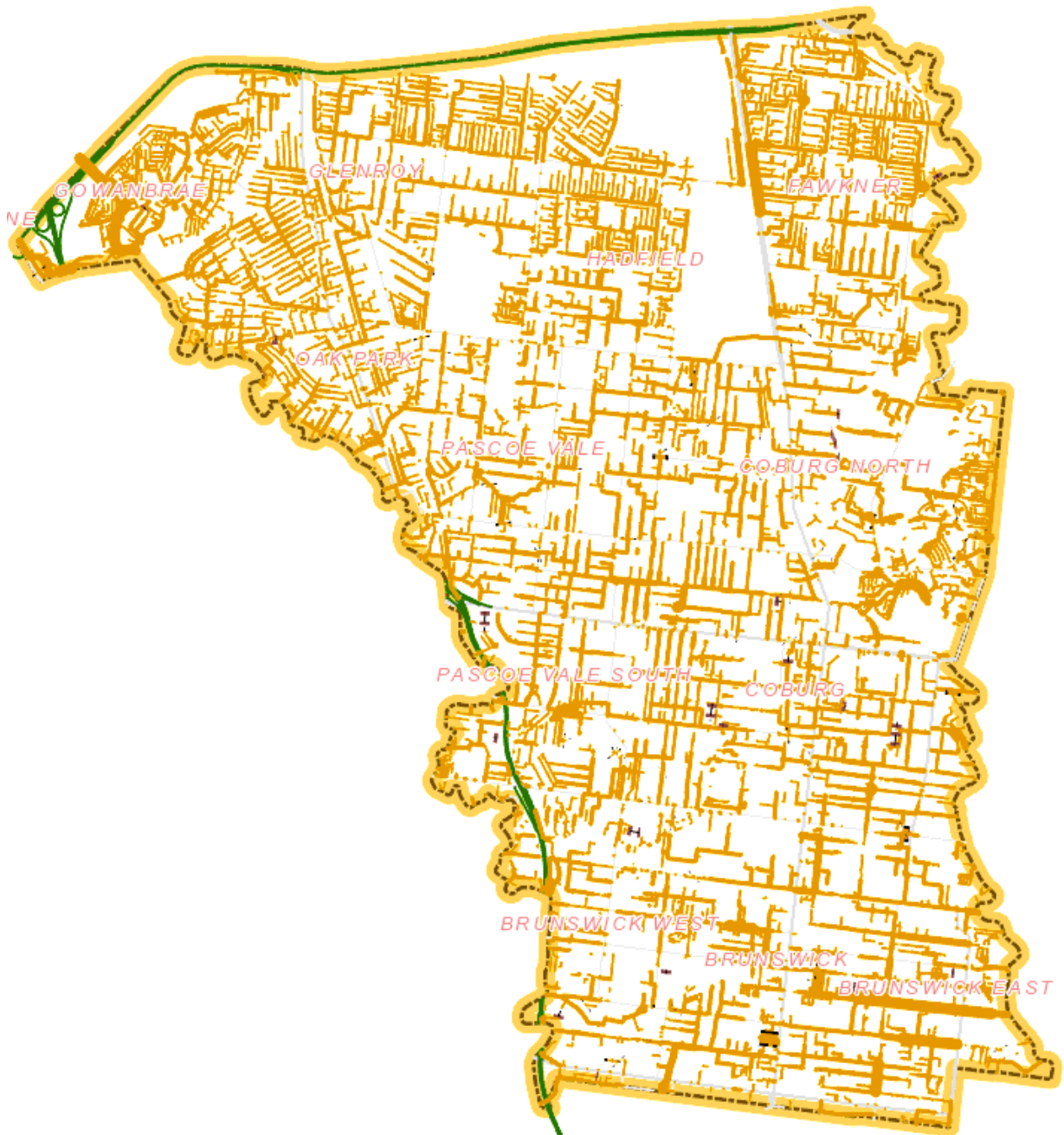
- D18/468634 - Moreland Flood Mapping & Modelling Project Report - Engeny Consulting
- D19/73610 - Moreland Drainage Improvement Strategy for 1% AEP - Stage 1 Report – Consideration of 38 of the flooding hotspots to determine and prioritise the mitigation works and associated estimated cost to address them
- D19/328896 - Moreland Drainage Improvement Strategy for 1% AEP - Stage 2 Report – Identify the worst affected flooding hotspots from stage 1 and re-prioritisation of the 10 mitigation sites and recommended staging of works based on Council's capital works budgets.
- D19/481664 - Development of the Moreland Council Flood Extent - SBO Technical Report
- D20/158012 - 10% AEP Mitigation hotspots maps – draft

Melbourne Water Drainage Network

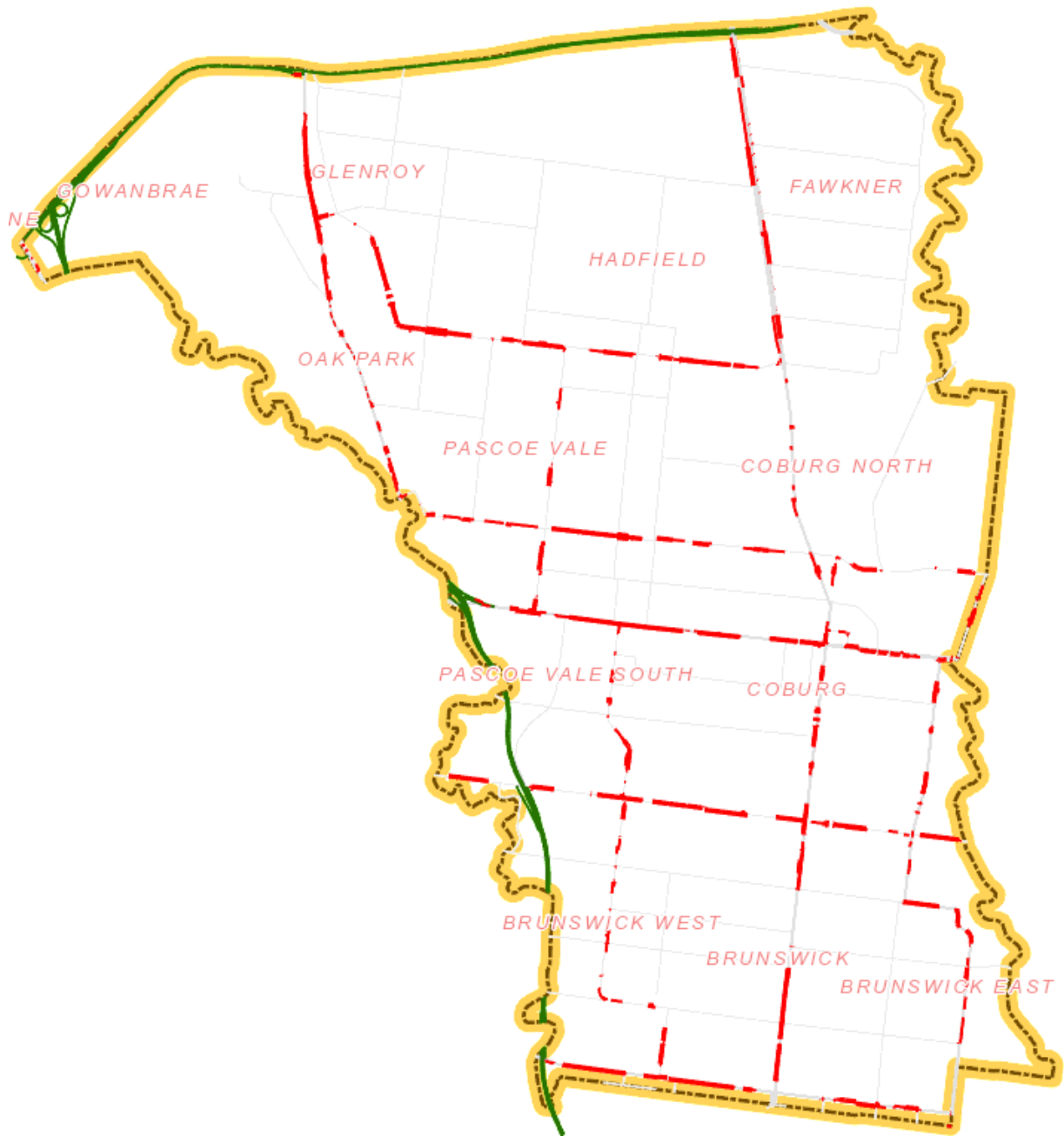




Moreland City Council Drainage Network



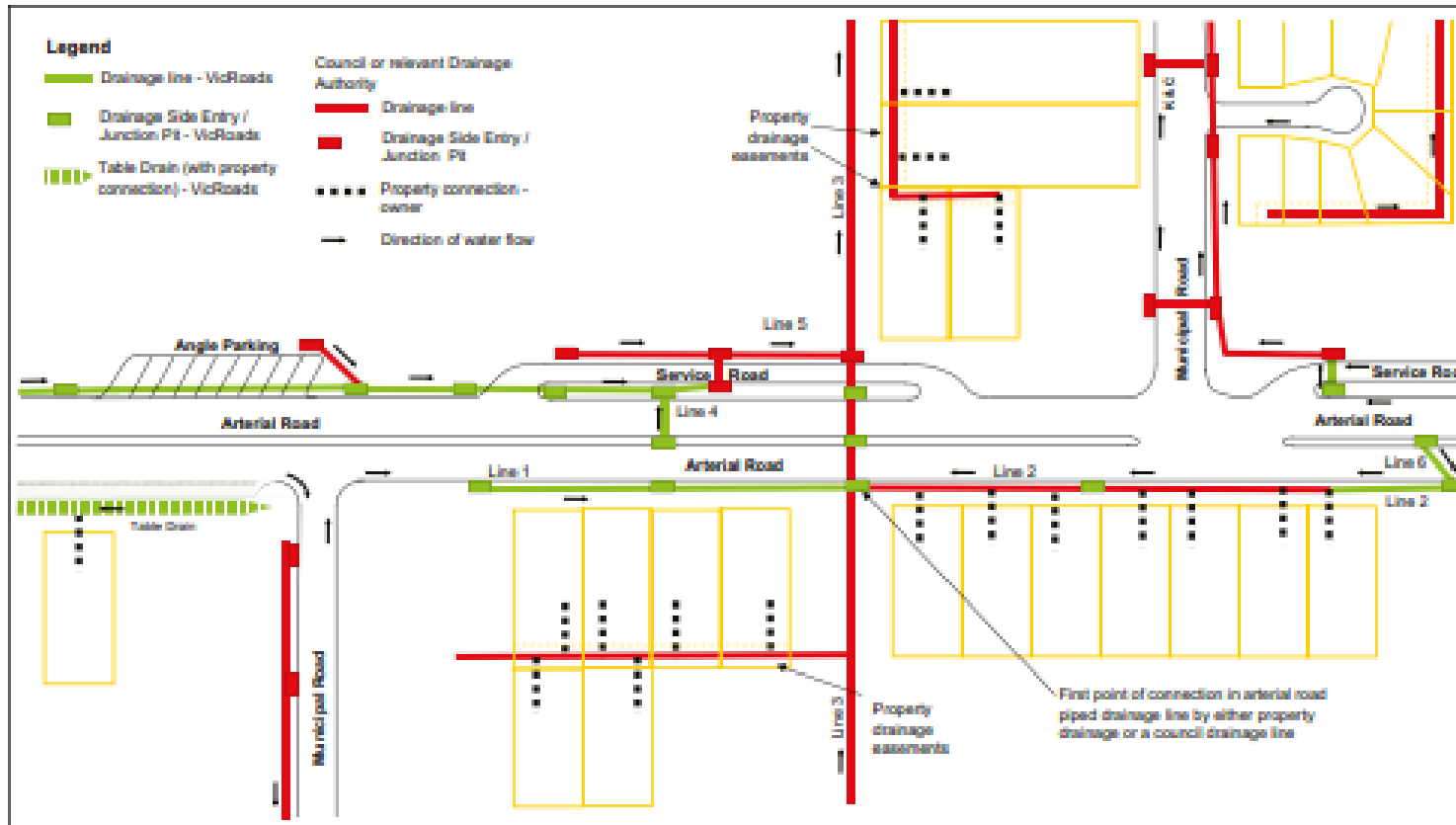
VicRoads Drainage Network



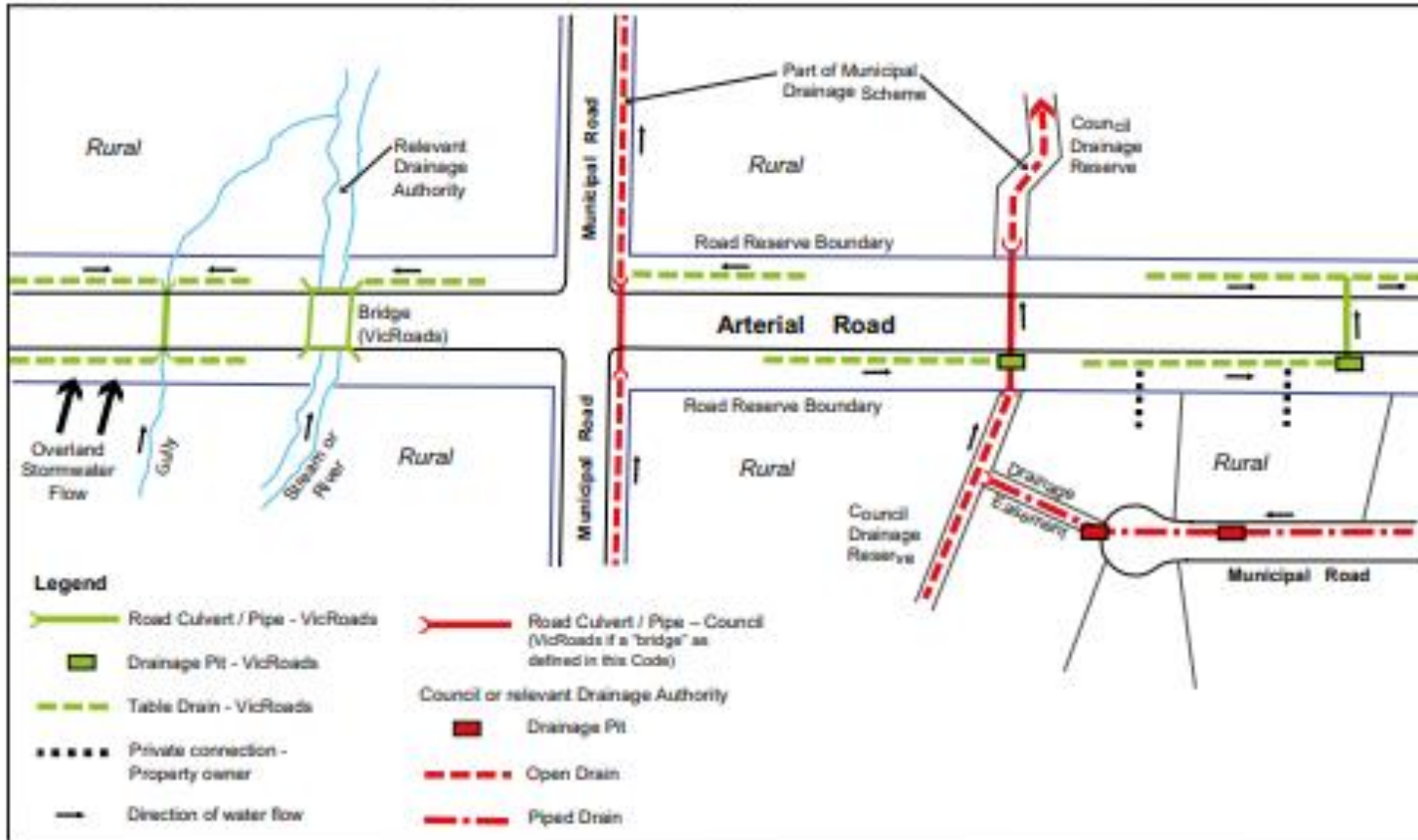
Extract from VicRoads Code of Practice 2017 Operational Responsibility for Public Roads

(see Code of Practice for further details)

**Figure 8(a) : Road Drainage – Responsibility Demarcations**



**Figure 8(b) : Road Drainage – Responsibility Demarcations**



### Drainage Network Risk Assessment

		Number	Name
		D20/292161	Performance of MCC Drainage Network

Analysis Conducted by	Geoff Bolling
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Part A		Part B	Part C	Part D	Part E		Part F	Part G	Part H
Describe Risk		Likelihood	Consequence	Raw Score	Controls		Likelihood	Consequence	Raw Score
<b>Risk Reduction resulting from Increased funding to improve drainage network</b>									
<b>Existing Network - Areas identified by Engeny</b>					<b>Improved Network</b>				
Rainfall 1% AEP	Water entering any residences	Unlikely	Moderate	16	Rainfall 1% AEP	Water entering any residences	Rare	Moderate	8
Rainfall 10% AEP	Water entering any residences	Possible	Minor	21	Rainfall 10% AEP	Water entering any residences	Unlikely	Minor	14
			<b>Total</b>	<b>37</b>				<b>Total</b>	<b>22</b>
			<b>Average</b>	<b>19</b>				<b>Average</b>	<b>11</b>
<b>Risk Reduction resulting from implementation of the Planning Scheme Overlay</b>									
<b>Existing Planning / Building Controls</b>					<b>Improved Planning / Building Controls</b>				
Rainfall 1% AEP	Water entering new developments	Unlikely	Moderate	16	Rainfall 1% AEP	Water entering new residence	Rare	Insignificant	4
Rainfall 1% AEP	Increased flood levels due to constricted flow paths	Unlikely	Minor	14	Rainfall 1% AEP	Increased flood levels due to constricted flow paths	Rare	Minor	7
			<b>Total</b>	<b>30</b>				<b>Total</b>	<b>11</b>
			<b>Average</b>	<b>15</b>				<b>Average</b>	<b>6</b>
<b>Risk Reduction achieved due to current works practices</b>									
<b>No Proactive Pit Cleaning</b>					<b>Proactive Pit Cleaning</b>				
Rainfall 10% AEP	Road Flooding (local flooding)	Possible	Insignificant	12	Rainfall 10% AEP	Road Flooding (local flooding)	Unlikely	Insignificant	8

Rainfall 10% AEP	Water entering any residence (local flooding)	Possible	Minor	21	Rainfall 10% AEP	Water entering any residence (local flooding)	Unlikely	Minor	14
			<b>Total</b>	<b>33</b>				<b>Total</b>	<b>22</b>
			<b>Average</b>	<b>17</b>				<b>Average</b>	<b>11</b>