WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2021

Oxford Rural Drainage Scheme

3 Waters | July 2021

Prepared by

Waimakariri District Council

215 High Street,

Private Bag 1005

Rangiora 7440,

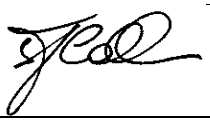
New Zealand

waimakariri.govt.nz

Revision History:

Revision Nº	Description	TRIM	Date
A	Draft for Presentation to U and R Committee	200120006595	18/12/2020
C	Draft for presentation to Council	200120006595	23/02/2021
D	Final for presentation to Council	200120006595	

Document Acceptance

Action	Name		Signed	Date
Prepared by	Kalley Simpson	3 Waters Manager		17/02/2021
	Simon Collin	Infrastructure Strategy Manager		21/01/2021
	Chris Bacon	Network Planning Team Leader		17/02/2021
Reviewed by	Kalley Simpson	3 Waters Manager		17/02/2021
Approved by	Gerard Cleary	Manager Utilities and Roading		17/02/2021
Adopted by	Council			

Contents

Tables

Figures

1 Executive Summary

The following table provides a summary of the key asset management issues of the Oxford Rural Drainage Scheme identified through consideration of the levels of service, consents, asset condition, risk analysis, disaster resilience, growth projections, and capacity assessment:

Table 1: Key Asset Management Components

Levels of Service	Customer levels of service are measured at district level and reported in the Drainage Overview document. Of those levels of service not met the failures related to response times not being achieved. Overall the district customer satisfaction at 76.1% (satisfied or very satisfied) did not meet the 90% target There is only one scheme specific service level, which has been met
Resource Consents	No consents relate specifically to this scheme, but a new district wide consent has recently been granted from Ecan for the maintenance of rural waterways
Capacity & Performance	The open drainage network is expected to have sufficient capacity for the target levels of service. Regular maintenance, and a prompt response to notification that drains are in need of a clean is required to maintain capacity
Asset condition	TA number of structural assets (Bennetts Diversion Drop Structures and the Deep Creek Spillways) are aging, and will need a detailed assessment in the first three years of the 2021-2031 LTP
Risk Assessment	There are no extreme or high risks on this scheme as identified through the Risk Assessment.
Disaster Resilience	There are 60m of reticulation mains considered to be at moderate risk in an earthquake, but there are no plans to replace these assets.
Growth Projections	Future growth may have some impact, but it will be mitigated by the need to control discharges to predevelopment levels.

2 Introduction

The purpose of this Activity Management Plan (AMP) is to outline the significant issues associated with the Council's assets and to show how the Council proposes to manage the schemes in the future.

This plan summarises the various components of the Oxford Rural Drainage Scheme, its condition and performance, and identifies future funding requirements including upgrades where necessary.

The data that has been relied upon to produce this document was taken at the end of the 19/20 financial year. i.e. 30 June 2020.

Further details of the asset management practices used by Council to manage this scheme are summarised in the District Drainage AMP Overview document.

Projects identified to improve asset management processes for this scheme will also benefit the performance of the other 3 waters schemes and are managed at a District level for efficiency.

Projects are also identified within this AMP that will maintain or improve levels of service.

All figures within this AMP exclude inflation.

3 Related Documents

The following related documents have been used as reference documents or for guidance in the development of some of the sections in this Activity Management Plan.

- Waimakariri District Plan
- Population in the Waimakariri District (TRIM 170328030077)
- New Projections for LTP 2021-2031 (TRIM 200908117997
- WDC Asset Management Policy (TRIM 180605062091)
- 2019 Customer satisfaction Survey (TRIM 200313034937)
- Development Contributions Policy 2021/22 (TRIM 200729095963)
- Flood Mitigation Works and Funding (TRIM 141009110892[v2])

4 Scheme Description (What Do We Have?)

The Oxford Rural Drainage Scheme consists of two areas, East Oxford and West Oxford.

East Oxford surrounds the Oxford Township and extends to the north east.

West Oxford is a rural area west of Oxford Township. It is the smaller of the two areas that make up the Oxford Rural Drainage Scheme.

Both areas at present exclude their hill catchments although in some cases runoff from there is a major part of the catchment flow. Each area has a network of open drains discharging into the watercourses of the Ashley, Cust and Eyre River catchments.

In addition there is a series of drop structures known as part of the Bennetts Diversion situated south of the Rangiora Oxford Road and east of Warren Road. This diversion takes stormwater runoff from the Oxford Township to the Eyre River. A further major structure known as the Deep Creek Spillway, takes upstream runoff down a steep terrace to the Ashley River. A smaller unnamed

spillway is further upstream and a bridge downstream of the Deep Creek Spillway. There are no other significant stormwater or land drainage assets in the Oxford Rural Drainage Scheme.

Other factors of note include a nationally significant population of mudfish in the West Oxford drainage area. This area is described in literature and the Council omits this area from any drain cleaning operations.

Some key statistics (end of 2019/20 year) of the scheme are shown in Table 2 to 5.

The extent of the currently serviced area is presented in Figure 7, at the end of the document.

Table 2: Scheme Statistics for 2019/2020

Scheme Parameter	Statistics	Source
Drainage System	Gravity	
Drainage Area	5,245 hectares	Source - GIS Layer
Reticulation and Treatment	Open channels and drains, no formal treatment.	
Length of Network	0.1 km Main 61.4 km Channel	Drainage Asset Valuation Tables 9-4 and 9-5, pages 66 to 68.
Total Replacement Value	$2,581,678	
Depreciated Replacement Value	$2,251,682	
Rated Properties	447	Source 2019/20 Rating Query

Table 3: Stormwater Pipe Data Summary

Stormwater pipe length (m) by diameter and pipe material			
Pipe Material	**Pipe Diameter (mm)**		
	225	>1200	Total
Concrete	19m	60m	79m
Total	19m	0m	79m

Table 4: Open Channel Drain Data Summary

Open Channel Drains	
Material	**Length (m)**
Unlined Drain	61,440
Lined Drain	0
Total	**61,440**

Table 5: Data References

Data Reference	Trim Reference
2020 3 Waters Asset Valuation	200824109857
2020 50 Year Water and Sewer Growth Forecast	200224024348

5 Scheme Management Issues (What Do We Need to Consider?)

There are a number of key aspects to consider when managing a drainage scheme; these include:

- Desired & actual levels of service
- Asset condition & criticality
- Capacity & performance
- Risks
- Growth predictions for the scheme

These issues have been assessed in detail and are summarised in the following sections.

5.1 Levels of Service

Table 6 sets out the performance measures and targets for the scheme, and performance achievement against targets since 2008.

Mandatory performance measures are measured at the district wide level and are not included in the individual drainage scheme AMPs. They are located in the District Overview Drainage Activity Management Plan. However, there is considerable overlap between the measures at Scheme and District levels. Mandatory measures cover flooding, consent compliance, time to respond to faults, and complaints. The scheme LOS measures for rural schemes only include consent compliance, where relevant

None of the WDC targets are planned to change over the 10 year LTP period, so only the one target value has been shown in this document

Performance in Table 6 is measured against the performance measures set in 2018, as part of the 2018-28 Long Term Plan process. Going forward from 2021 onwards, performance will be against the modified set of performance measures that were presented to the Council's Utilities and Roading Committee in 2020 (refer report 200406043184[v2]), and subsequently approved by Council. These revised levels and targets are detailed in the District Overview Water Supply Activity Management Plan.

Table 6: Elective (non-mandatory) Levels of Service Targets and Performance Measures as Assessed in 2020

**** Note "Y" indicates that the LOS has been met, and "N" indicates it has not been met***

[#] Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment.

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results*			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
Resource Consent	Consent Breach	Number breaches of consent conditions that result in an Ecan report that identifies compliance issues.	Nil per year	0%	There were no consent breaches that resulted in non-compliance reports being received from Environment Canterbury for FY 19/20.	Achieved	N/A	Y	-	-	-

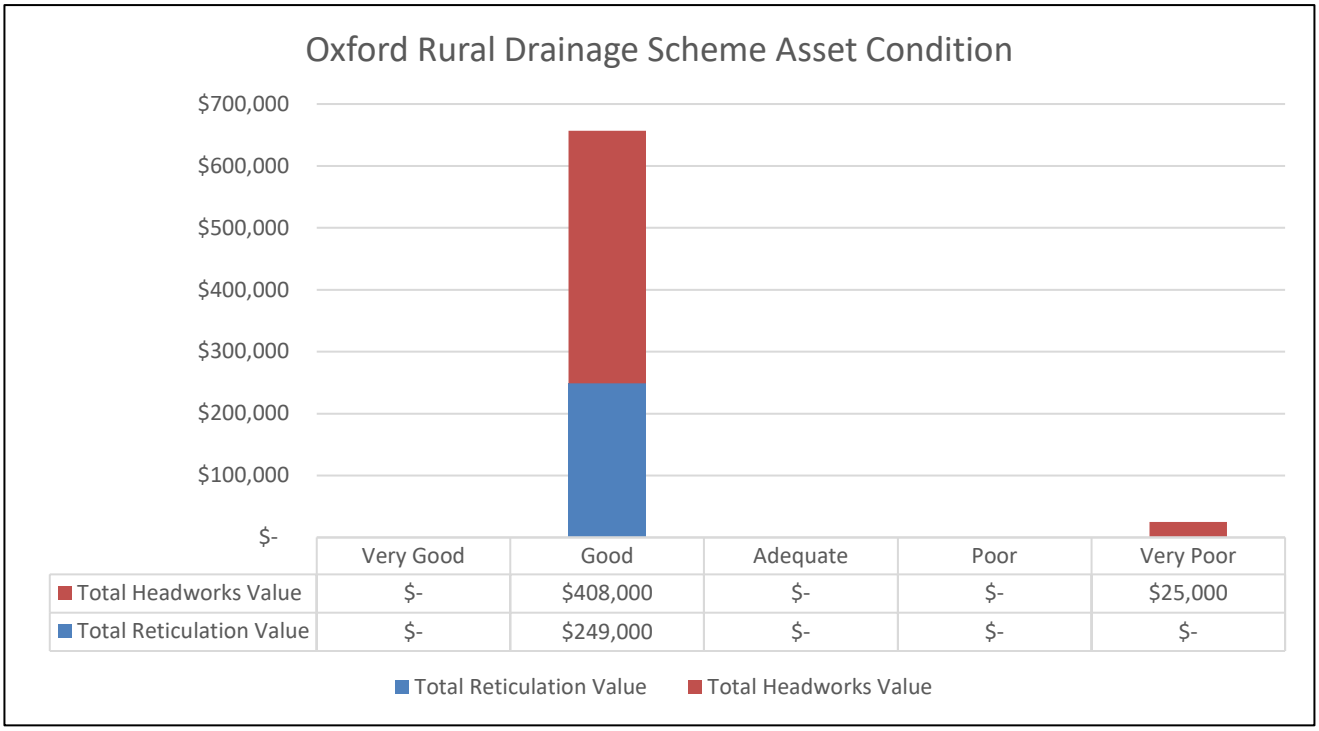
5.2 Asset Condition

The current assessment of asset condition for hard assets (as against the open drain network) is based on theoretical remaining useful life derived from component age and adopted useful life. Adjustments to the remaining life are made to individual components where information is available to suggest the theoretical remaining life is inappropriate.

Figure 1 summarises the theoretical asset condition for both the network and headworks in a graph, while Table 7 provides more detail about the value of the assets within different asset condition categories

A number of hard assets, the Bennetts Diversion Drop Structures, the Deep Creek Spillways (Carleton Ashley Rd and Ashley Gorge spillways), and Carleton Ashley Bridge are aging, and will need a detailed assessment in the first three years of the 2021 -2031 LTP

Figure 1: Asset Condition Summary



"Headworks" is inclusive of all above ground assets associated with the scheme

Table 7: Pipe Condition Summary

Condition Grade	Definition	Pipeline Quantity	Total Reticulation Value	Total Headworks Value	Total Value
1	Very Good *More than 80% of life remaining*	0.0 km *0%*	$ - *0%*	$ - *0%*	$ - *0%*
2	Good *Between 50% and 80% of life remaining*	0.1 km *100%*	$ 249,000 *100%*	$ 408,000 *94%*	$ 657,000 *96%*
3	Adequate *Between 20% and 50% of life remaining*	0.0 km *0%*	$ - *0%*	$ - *0%*	$ - *0%*
4	Poor *Between 10% and 20% of life remaining*	0.0 km *0%*	$ - *0%*	$ - *0%*	$ - *0%*
5	Very Poor *Less than 10% of life remaining*	0.0 km *0%*	$ - *0%*	$ 25,000 *6%*	$ 25,000 *4%*
Total		**0.1 km**	**$249,000**	**$433,000**	**$682,000**

5.3 Asset Criticality

Asset criticality provides an indication of the importance of an individual asset and the corresponding impact on the service delivery should the asset fail for any reason. Criticality is used in risk based investment decisions to help decide when an asset should be replaced to avoid the consequences of failure. For 3 Waters the Council has developed an assessment process for pipes and other replaceable assets which scores assets from most critical 'AA' to least critical 'C'. Further details of the criticality assessment methodology is covered in the Drainage Overview AMP.

However it does not apply to the majority of rural drainage scheme assets, which are open drains and channels which can be maintained effectively in perpetuity. The criticality assessment is used as an input to the renewals model

The criticality scoring process, has been significantly improved through automation and dynamic links to GIS data layers for this AMP

5.4 Risk Assessment

An Operational Risk Assessment was first undertaken for the components of the Drainage Scheme in 2004, and it has been regularly updated since that time. It was last updated for the 2015 AMP review.

The District Wide Overview details the risk events considered and includes a summary of the risk assessment results for all the drainage supply schemes and is useful in indicating overall drainage network priorities.

Table 8 summarises the risks for the Oxford Rural Drainage Scheme.

Table 8: Number of Events per Level of Risk

Risk Level	2004	2008	2011	2014
Extreme risks	0	0	0	0
High risks	0	0	0	0
Moderate risks	5	5	6	6
Low risks	10	10	10	10
Not applicable	12	12	12	12
Total	27	27	28	28

The table shows there are no high or extreme risks on this scheme. District wide, moderate risks are being deferred until extreme and high risks have been addressed.

5.5 Disaster Resilience Assessment

The 2009 Disaster Resilience Assessment (DRA) is a desk top study that primarily considered the risks to above ground structures presented by natural hazard events across all Council operated 3 Waters schemes. The original assessment was updated in 2012 using revised hazard and asset behaviour information captured during the 2010-11 Canterbury earthquake sequence.

The Oxford scheme area is not susceptible to liquefaction, so the pipeline vulnerability assessment process carried out within other scheme boundaries is not relevant. However reticulation mains

were assessed for earthquake risk, and concluded to be moderate low risk. No specific mitigation actions were identified.

Above Ground Facilities

There are no above ground drainage assets in this rural scheme.

Table 9 details the hazard impacts that the scheme is exposed to.

Table 9: Risks to Assets

Threat	Hazard Impact
Flooding	Up to 2 metres of flooding from local sources in isolated pockets of the scheme.
Earthquake	Vulnerable to shaking effects
Liquefaction	None
Slope Hazard	Very low to significant hazard
Tsunami	None
Wildfire	Low to extreme threat
Snow	50-60+cm could be expected
Wind	High threat
Lightning	District wide hazard
Terrorism	District wide hazard

The Councils response to these risks is being managed at a district level via the DRA Action Plan and related projects. Refer to the District level AMPs for details.

5.6 Growth Projections

There are a number of factors that are likely to influence future demand on land drainage systems. These may include:

- Population trends
- Changes in land use
- Climate change
- Changes in legislation
- Advancements in drain management

East Oxford and West Oxford areas that make up the Oxford Rural Drainage Scheme contain mostly dairy farms, with other livestock such as deer and sheep also represented with very few life style blocks. There is the possibility of growth from lifestyle blocks or rural residential development, but Council's policy of requiring developments to control discharges to predevelopment levels will mitigate effects.

The overall district population growth scenario used for the 2021 AMP update was supplied by Council's Development Planning Unit, broken into towns and rural areas. Stormwater growth projections were calculated using the New Projections for LTP 2021-2031 (TRIM200908117997), which was the basis for infrastructure planning.

Due to issues that have occurred with the Census 2018, the population projections that would normally be used as a basis for updating the work previously developed by the Council's Development Planning Unit have not been released by Stats NZ in time for the development of this assessment.

However, based on the historical growth patterns of new dwelling Building Consents over the last three years (636 in 2017/18, 661 in 2018/19 and 615 in 2019/20), the projections used for the previous LTP/infrastructure strategy remain valid to be used for infrastructure planning. As the timeframe for this infrastructure planning is for the thirty years between 2021 to 2051, the previous population projections have been extended out a further three years, as documented in New Projections for LTP 2021-2031 (TRIM200908117997).

It is important to provide a brief comment on COVID19 and the impact it could have on population projections. At the time of writing this paragraph (August 2020), New Zealand is currently in Level 3 restrictions in Auckland and Level 2 restrictions in the remainder of the country. While international migration is currently low arising from the COVID19 travel restrictions, a significant number of New Zealanders are returning home due to the impact of COVID19 on overseas countries. This has contributed to a high level of population growth nationally over the last six months, which has had a flow on effect to growth in the Greater Christchurch and Waimakariri Districts. How long this might continue for and when international migration (from other countries) might return to pre COVID levels is still to be determined. However the existing population projections remained the most appropriate to use for infrastructure planning at this time.

Growth in the number of properties expected to be included within the whole drainage scheme are included in Table 10 below.

Table 10: Growth Projections

Oxford Rural	Rates Strike	Years 1 - 3	Years 4 - 10	Years 11 - 20	Years 21 - 30
	2019/20	**2021/22 to 2023/24**	**2024/25 to 2030/31**	**2031/32 to 2040/41**	**2041-42 to 2050/51**
Projected Properties	447	490	551	632	704

Note that the time frames have been chosen to reflect the periods 3, 10, 20, 30 and 50 years from the AMP release date, however due to the time it takes to complete the analysis the base rates strike data used was from 2019/20.

To calculate connection growth numbers from the population projections, existing Oxford Rural drainage connections were counted then the rural population growth profile (from New Projections for LTP 2021-2031 (TRIM200908117997)) was applied, for the development horizons in Table 10.

Capacity & Performance

The Oxford Rural Drainage Scheme is expected to have sufficient capacity for the target Levels of Service. As most of the system consists of open drains, regular maintenance is required so that the capacity can be maintained.

The system has two significant structures (the Bennetts Diversion Drop Structures and the Deep Creek Spillway). Whilst these assets are aging, the current condition of each remains good at the present time and no further major maintenance is expected for at least a further five years.

6 Future Works & Financial Projections (What Do We Need To Do?)

This section covers the future works required to meet the target levels of service, maintain the asset in an acceptable condition, reduce the risks to an acceptable level and accommodate growth.

6.1 Operation & Maintenance

Maintenance of the open drains is a combination of proactive and reactive work. Drains known to require clean out are completed on an annual basis, with other drains being cleaned when notification is given by adjacent landowners. Much of the routine work is done in the summer months when weed growth is at its peak. In some locations only hand cleaning and or spraying is possible given the limited access available.

Depending on weed growth, some areas may be cleaned more than once a year. This is particularly so where drains are in highly visual areas such as retention ponds. In addition to weed-spraying, drains are cleaned out and re-shaped with a digger depending on condition.

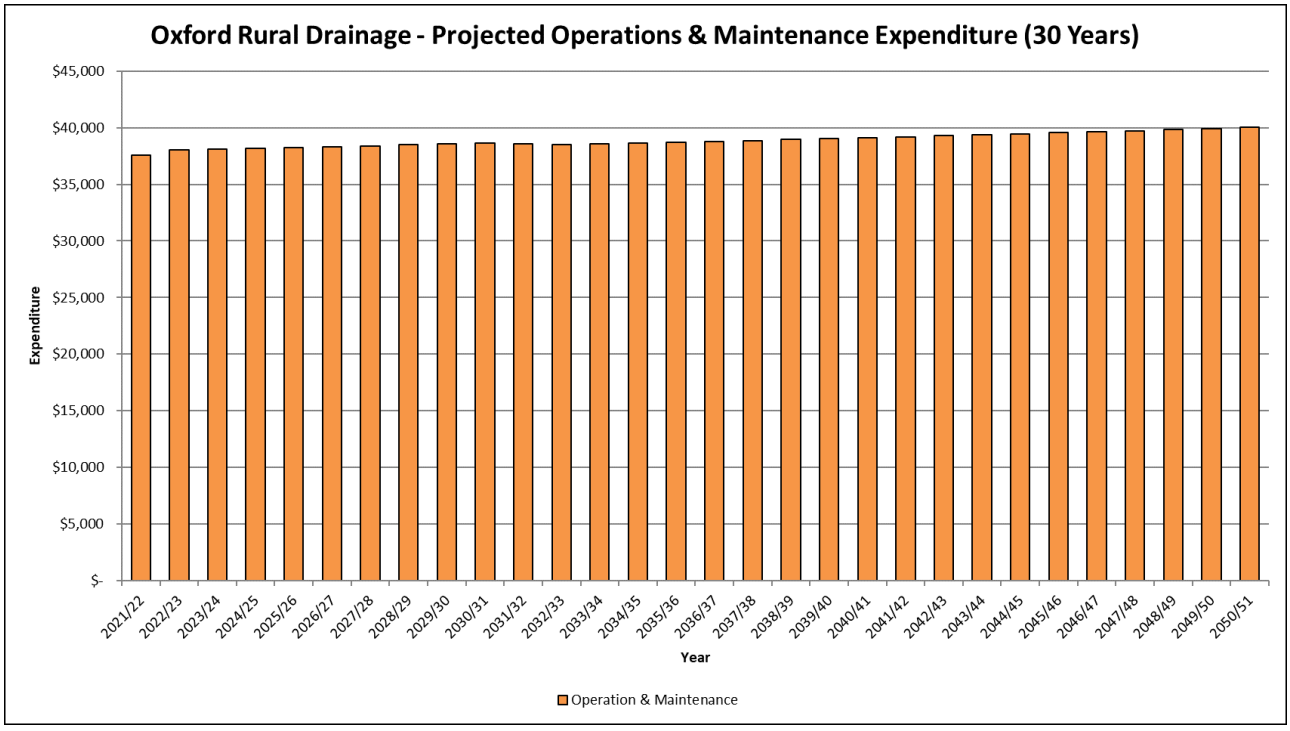
There are no pump stations in the Oxford Rural Drainage Scheme, so Council's Water Unit are not involved in maintenance. Inlet grills and more rural drains are maintained by the WDC Drainage Maintenance Contractor

Little active maintenance is carried out on the reticulated network. The CCTV programme now under way will provide information as to whether more active maintenance is required.

Figure 2 shows the projected Operations and Maintenance budget over the next 30 years.

Systems are not yet in place to capture the cost distinction between planned and unplanned maintenance.

Figure 2: Projected Operations & Maintenance 30-Year Budget



6.2 Renewals Programme

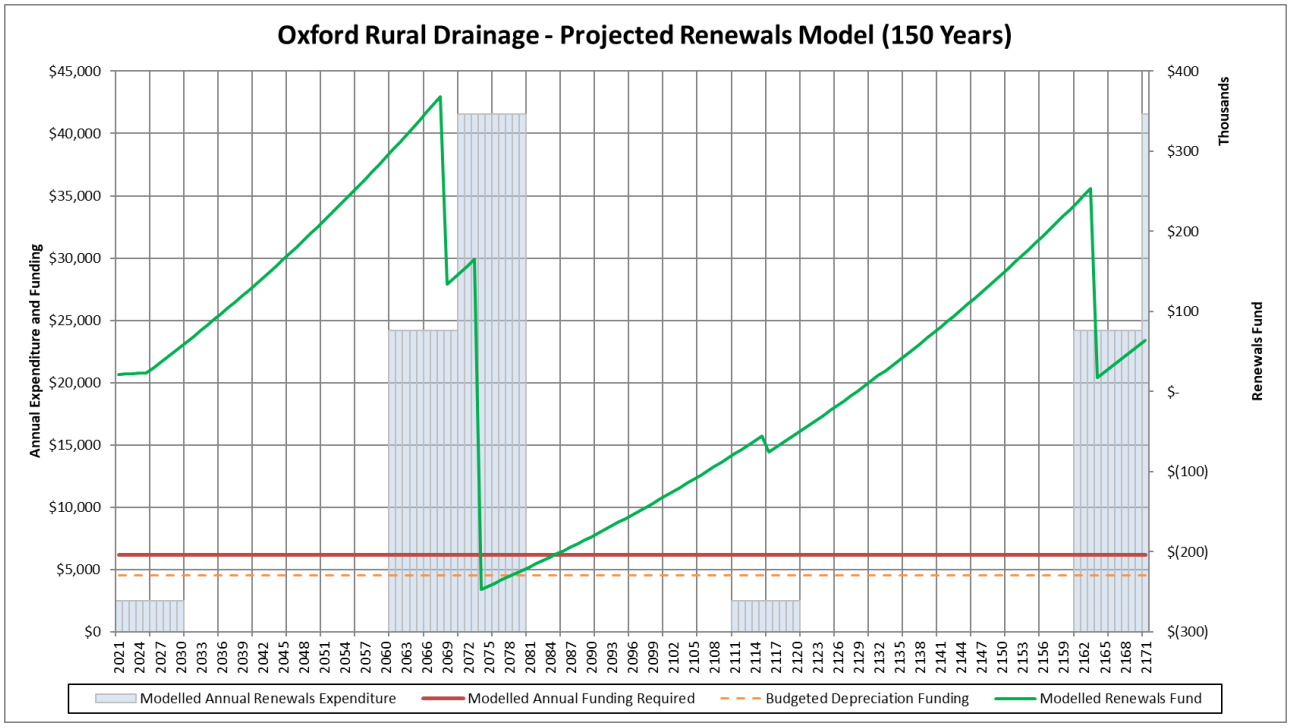
The renewals programme is determined in two stages. The renewals model, details of which are provided in the overview document, provides a long term view of the income required to ensure that a renewals fund is sufficient to enable future asset renewals, without needing to borrow.

The model also prioritises candidates for consideration by Asset Managers for renewal based on criticality, risk, and expected asset life, which is the second stage of the renewals programme development.

Figure 3 below shows the financial output from the model alone. Over a 150 year period it shows the projected expenditure; the value in the renewals fund; the level of funding required to ensure the fund can meet the required renewals programme, and the annual depreciation.

The figure only shows the output from the model, so expenditure shown in the graph for the first ten years may be different from the expenditure shown in the LTP, as adjustments may have been made by the Asset Manager from the direct renewals model outputs.

Figure 3: Annual Drainage Renewals 150 year Budget



The key parameters in the figure above are explained below:

- **Modelled Annual Renewals Expenditure:** This is the direct output from the renewals model, recommending the annual investment to be made in renewals each year.
- **Modelled Annual Funding Required:** This is the amount of annual renewals funding required, to ensure there are sufficient funds available to carry out the recommended annual renewals each year.
- **Budgeted Depreciation Funding:** This is the actual amount of depreciation being collected, which is extracted from the Council's budgets.
- **Modelled Renewals Fund:** This is the modelled balance in the renewals account, assuming the annual funding and annual expenditure is completed as per the recommendations from

the renewals model. As can be seen, this account is maintained as a surplus, peaking later this century, before being drawn down as the first lifecycle of current assets is completed.

The key point to note is that the Budgeted Depreciation Funding is less than the Modelled Annual Funding Required. The reason for this discrepancy is as follows:

Depreciation Discount Factor: Council's financing of future renewals incorporates the expectation that depreciation funding can be invested at a higher rate of return over the life of the assets than inflation. Further information regarding this approach is provided in the Finance Policy. This concept is embodied in the scheme budgets in the form of a discount rate (referred to in the budgets as the 'Depreciation Discount Factor'). This reduces the annual depreciation funding required from rates, while still ensuring that there will be sufficient funding available to renew assets at the end of their useful life. The renewals model takes a simpler and more conservative approach to the way this effect is calculated, which accounts for the difference shown in Figure 3.

6.3 Capital Works

The following graph shows the 50 year budget for all capital works, including projects driven by growth and levels of service. It does not show flood improvement works which is expenditure funded by the district drainage rate.

Figure 4: Projected Capital Works Expenditure

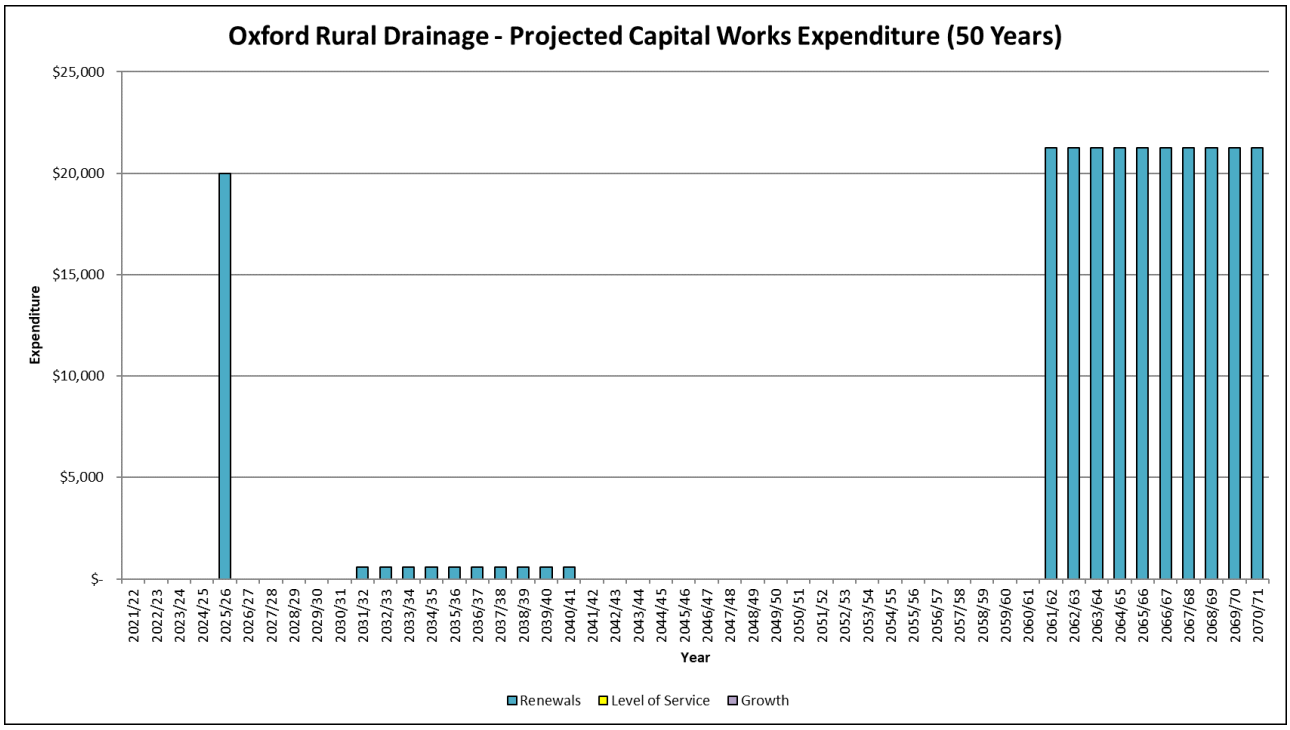


Table 11 provides more detail of all planned capital works over the next 50 years, including renewals, but excluding projects funded by the district drainage rate.

The level of confidence in the budget for the works (High / Medium / Low) is presented in the table. For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP. The figures in the table are not adjusted for inflation.

Any programme or project that occurs over a number of years, such as the renewals programme, is only shown within the table for the first year in which it occurs. The Project Value indicates the projected total cost of the project over the number of years it occurs.

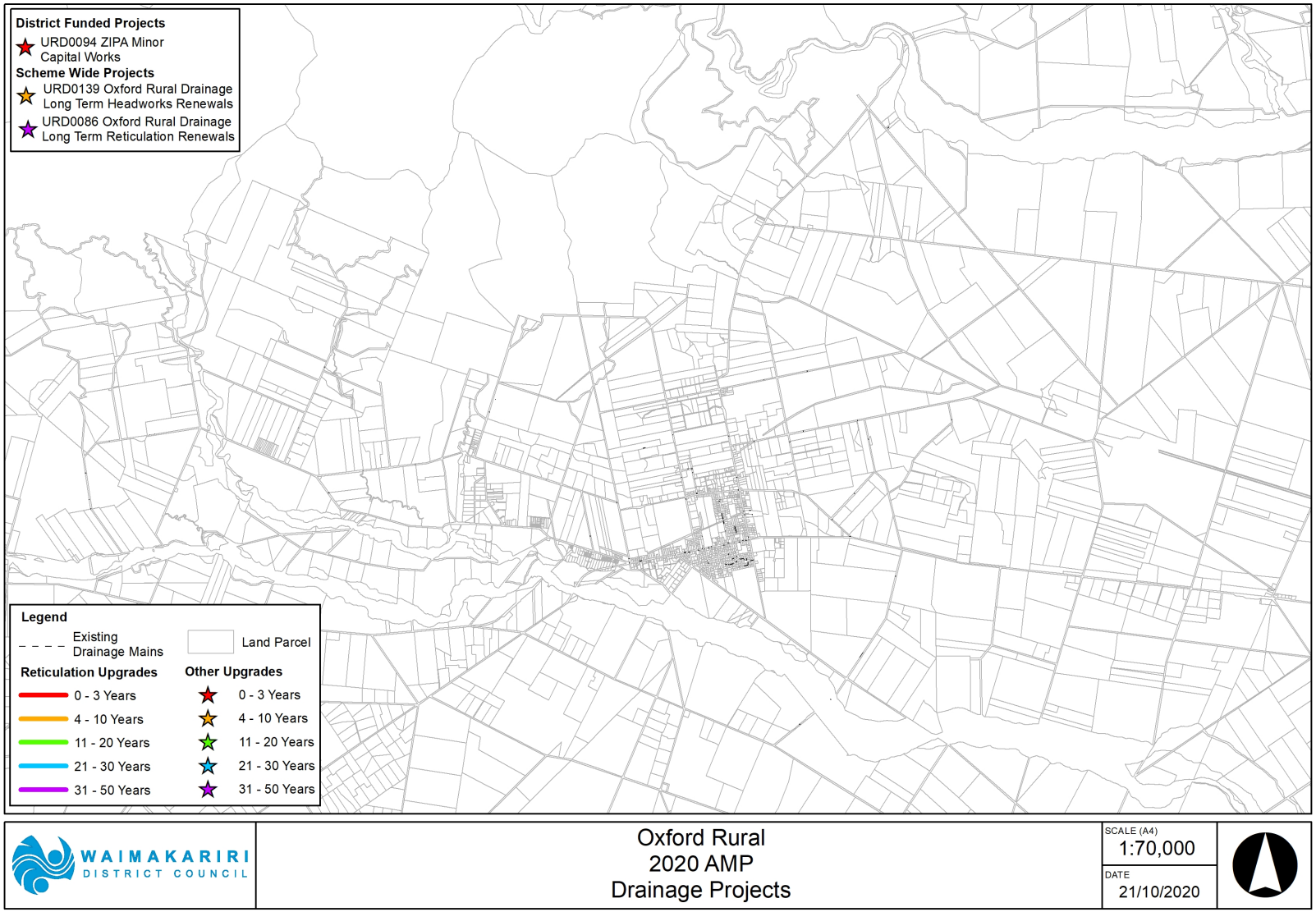
Table 11: Summary of Capital Works (Including Renewals)

Year	Project ID	Project Name	Level of Confidence	Project Value	LOS Component	Renewals Component	Growth Component
Year 1 - 10							
2026	URD0139	Oxford Rural Drainage Long Term Headworks Renewals	3 - Low	$ 25,887	$ -	$ 25,887	$ -
Year 31 - 50							
2062	URD0086	Oxford Rural Drainage Long Term Reticulation Renewals	3 - Low	$ 212,597	$ -	$ 212,596	$ -
Grand Total				$ 238,484	$ -	$ 238,483	$ -

Flood Response Programme

There are no planned works within this scheme to be funded by the District wide flood response rate

Figure 5: Projected Capital Upgrade Works (not to scale)



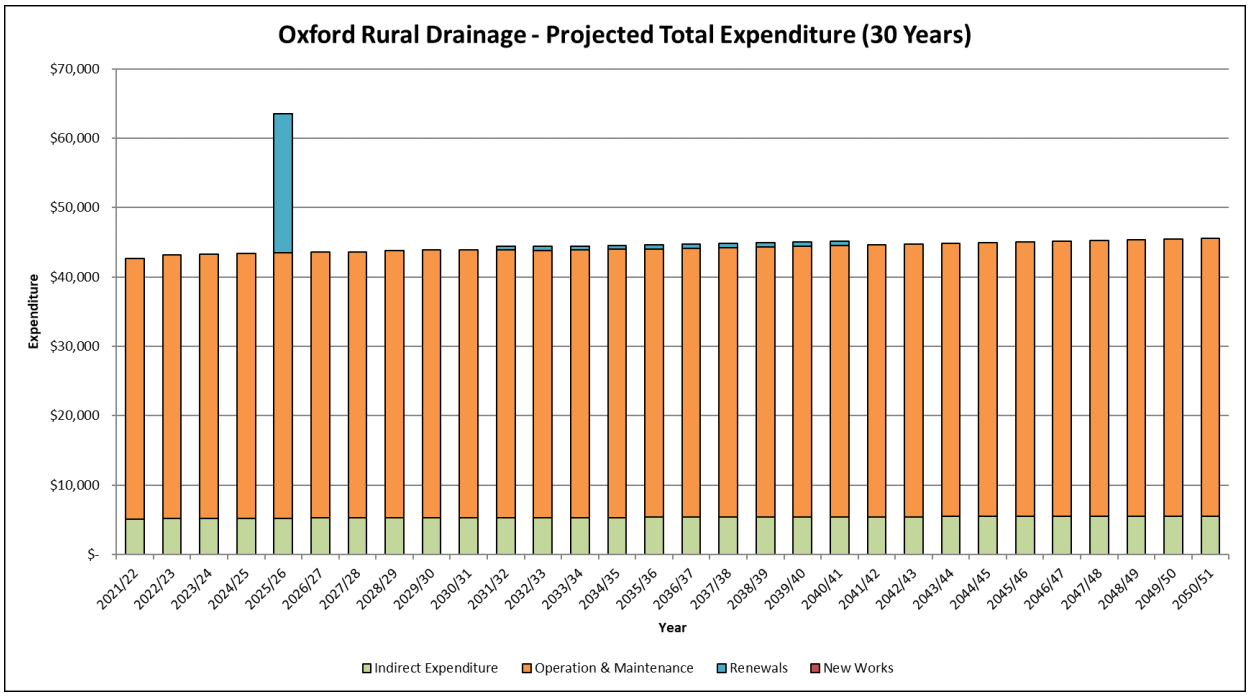
6.4 Financial Projections

The following graph summarises the breakdown of projected total expenditure over a 30 year time horizon. It includes both operational and capital expenditure. Operational costs include operations and maintenance, and indirect expenditure.

Indirect expenditure includes interest, rating collection costs, costs associated with maintaining the Asset Register, and internal overhead costs.

Capital includes expenditure for growth, levels of service and renewals, but excludes projects funded by the district wide drainage rate.

Figure 6: Projected Total Expenditure – 30 years



6.5 Valuation

A full peer reviewed valuation of assets is carried out on a three yearly cycle, using the asset data in our asset management information system. Table 12 below provides a summary of the replacement cost, depreciated replacement cost and annual depreciation for this scheme

Table 12: Asset Valuation

Asset Type	Unit	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Manhole	No.	0	$-	$-	$-
Sump	No.	0	$-	$-	$-
Valve	No.	0	$-	$-	$-
Network Main	m	79	$248,855	$133,154	$2,489
Open Channel	m	61,440	$1,899,237	$1,899,237	$-
Facilities			**$433,586**	**$219,292**	**$4,340**
Total			**$2,581,678**	**$2,251,682**	**$6,828**

6.6 Revenue Sources

Revenue is provided from two key sources; targeted rates and Development Contributions. Development contributions are calculated in accordance with Council's Development Contributions Policy (TRIM 191129168016), while targeted rates are charged in accordance with Council's Revenue and Financing Policy (TRIM 180522056008).

Generally rates are targeted rates charged to homeowners within the schemes geographical boundaries. There is also a district wide Flood Response rate which is used to fund flood improvement works anywhere within the district.

7 Improvement Plan

7.1 2021 Improvement Plan

Table 13 Details the scheme specific improvements recommended to address the management issues identified in Section 3. Each improvement item has been tagged to either a capital project or, a process improvement project to help manage and track Councils response. Short term indicates within the first three years of the LTP, long term, out beyond 2021.

If the table is empty, this indicates that all improvements required are either district wide improvements (covered by the Overview AMP), or covered by a capital project or projects, covered in the Capital Works section.

Table 13: 2021 AMP Improvement Plan

Project Ref	AMP Section	Project Description	Priority	Status	Estimated Cost
IP051	Levels of Service	Update or create a new model for the Oxford stormwater network	Medium	Planned for 2024	$36,000

APPENDIX 'A'. PLANS

Figure 7: A1 - Plan of Drainage Rating Area Properties Currently Rated Oxford Rural East

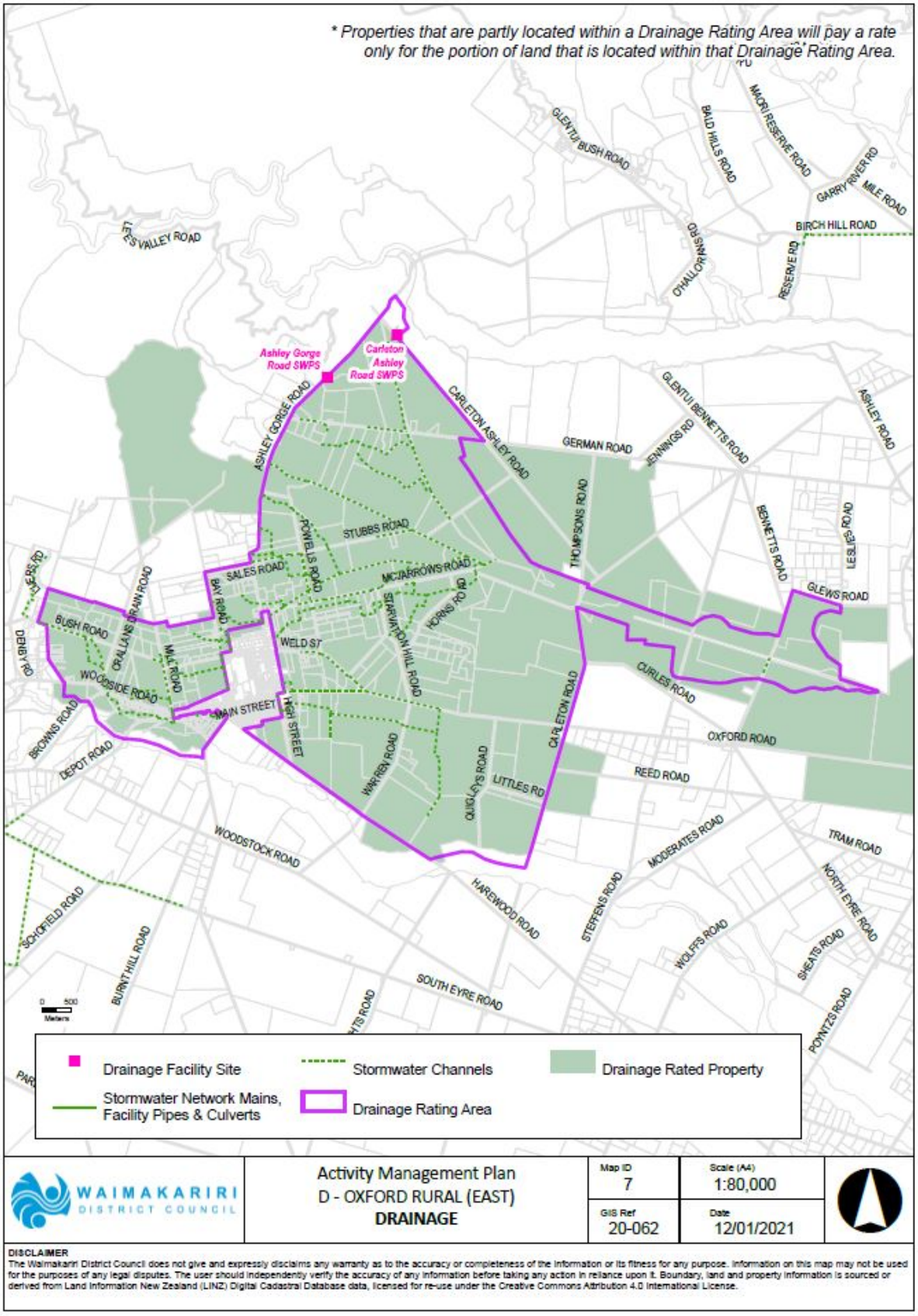


Figure 8: A2. Plan of Serviced Area