2018-2028 TRANSPORTATION ASSET MANAGEMENT PLAN

He Rautaki Whakahaere Rawa mō Ngā Ara Kawenga

PAVEMENTS

NGĀ ARA HĪKOI

VOLUME ONE | PUKAPUKA TUATAHI

Mountain to Sea

Te Kaunihera-ā-Rohe o Ngāmotu

NEW PLYMOUTH DISTRICT COUNCIL

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DOCUMENT CONTROL

Document Name	2018-2028 Transporation Asset Management Plan Volume 1 - Pavements
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1. INTRODUCTION

This volume provides details of the asset lifecycle management for the **Pavements** asset category of the Transportation AMP. The framework and key elements of the overall asset management plan are outlined in Table 1.

Table 1 Asset management document structure

No.	Document Name	Key Document Contents
1	Long Term Plan	Infrastructure Strategy • Strategic Framework • Guiding Themes • High Level Information for Each Asset Class Council Services • High Level Information • Levels of Service • Financial Plan
2	Asset Management Strategy	General Asset Management Principles and Overview
3	Asset Class General Volumes	General Information and Glossary about each asset class • Executive Summary • Introduction • Levels of Service • Future Demand • Risk Management Plan • Financial Summary • Plan Improvement and Monitoring
4	Asset Category Lifecycle Management Volumes	Asset Life Cycle Management for each asset category within each asset class • Description • Condition • Remaining Lives • Valuation • Operations & Maintenance • Renewals • Acquisition and Augmentation • Disposals • Annual Work Plan • Risk Management • Financial Summary • Improvement Plan

Purpose and Key Issues

Our purpose in managing these assets is to provide a pavement that is suitable for the effective movement of vehicles, including cycles). The surface must be suitable for all weather conditions and appropriate to its location and function in terms of skid resistance and smoothness. It must also have a structure suitable for traffic loading requirements.

There is continued pressure from NZTA to adjust NTLP contribution levels to RCAs based on demonstration of value and the key principle of bringing consistency across New Zealand's roads using the ONRC framework. Against this backdrop, the key issues being faced in relation to pavements are detailed in the Transportation Strategic Case (General Volume) and the Programme Business Cases.

1. INTRODUCTION

Levels of Service

The levels of service and investment KPIs for the operations, maintenance, renewals and minor improvement of the transportation system are included in Section 6 of the Transportation Strategic Case (General Volume). The investment KPIs are developed from the problem statements and benefits in the Programme Business Cases (PBCs) included in the Appendices of the Transportation Strategic Case (General Volume). The investment KPIs applicable to pavements are summarised in Table 2.

Table 2 Pavement Investment KPI Summary

Problems	Benefits	Investment KPIs (PBC for each one)
• The changing expectations of the community requires a reprioritisation of investment to meet the agreed and future Level of Service for all transport modes. • Growth in the movement of people and goods on key corridors will result in increasing travel time unreliability during peak periods. • Geology, weather and climate activity plus some sub-standard assets results in a high level of full and partial closures of the network impacting lifelines and economic viability. • Driver behaviour, safe system approach and other factors are resulting in a high proportion of Death and Serious Injury crashes for vulnerable road users.	• An easy to understand and efficient (economically viable) network for all transport modes • A resilient network • A safe network	1. Network Availability 2. Customer Satisfaction 3. Maintain Travel Time Reliability with Increased Activity 4. Value for Money 5. Response Times 6. Network Audit of Condition 7. Crashes

The particular measures used to monitor the performance of the pavement assets are shown in Table 3. More details about the measures are included in the Programme Business Cases included in the Transportation Strategic Case (General Volume).

Table 3 Pavement O&M KPIs

KPI No	KPI	Baseline Performance	Target Performance
1.1	ONRC Resilience – Customer Outcome 2 – number of instances where road access is lost with no viable detour	TBC	TBC
2.1	Count of complaints recorded by Contact Centre	33 per annum average 2011/12 – 2016/17	<=40 per annum
2.3	Quality roading network for users – quality (Communitrak Survey) – LoS 7	The average performance between 2005/06 and 2016/17 was 85%	85%
2.4	Quality roading network for users – easy, quick, safe access - (Communitrak Survey) – LoS 8	The average performance between 2005/06 and 2016/17 was 86%	85%
2.5	Arterial & Primary Collectors Structural Asphalt Rehabilitation	zero	250m/annum
3.1	Travel time between defined points	TBC	TBC
4.1	Sealed Road Pavement Rehabilitation - $/total km of sealed road/annum	$960/km/annum average over 3 years 2013/14 – 2015/16	$1,000/km/annum and check if in similar range to peer group RCAs
4.2	Chipseal Resurfacing - $/m2	$5/m2 average over 4 years 2012/13 – 2015/16	$5/m2
4.3	Asphalt Resurfacing - $/m2	$60/m2 average over 4 years 2012/13 – 2015/16	$60/m2
4.4	Unsealed Road Metalling - $/total km of sealed road/ annum	$2,545/km/annum average over 3 years 2013/14 – 2015/16	<= $2,500/km/annum and check if in similar range to peer group RCAs
4.5	Overall Network Cost (excluding emergency works) - $/ km	$9,600/km/annum average over 3 years 2013/14 – 2015/16	<= $10,000/km/annum and stay above 90% on national average
5.1	LoS 5 – respond to requests in reasonable timeframe	Current performance is 95%	Maintain at 95%
6.1	ONRC Amenity Customer Outcome 1 – Smooth Travel Exposure	84.3% Arterial, 91-93% Others	85% for Arterial roads and 90% for all other categories.
6.2	ONRC Amenity Customer Outcome 2 – Peak Roughness	TBC	TBC
6.4	Pavement Integrity Index (PII),	95.8% average 2005-15	>= 95% to prevent roads deteriorating to unacceptable standard.
6.5	Condition Index (CI)	98.4% average 2005-15	>= 98% to prevent roads deteriorating to unacceptable standard.
7.1	ONRC Safety Customer Outcome 3 – Personal Risk per 100M VKT	DSIs per 100 million vkt have been as low as 1 previously and an average of 2.7/annum between 2002 and 2015	1 or less DSI per 100 million vehicle kilometres travelled (use other measures i.e. DSIs at intersections and DSIs for vulnerable users to analyse where key issues may exist)

Related legislation, codes and standards include:

Basecourse:

- NZTA technical specifications for modified pavement layers (B7)
- Basecourse aggregate (M4)
- Benkleman beam deflection measurements (T1)
- Use of reclaimed tyre rubber n asphalt (TM6001)
- Basecourse aggregate meme (TM001)
- Structural design and construction of flexible unbound pavements (B3)
- Supply aggregate by weight (G2)
- Unbound road base and subbase aggregates evaluation (M22)
- Technical memoranda
- NZ Supplement to the AAPA National asphalt specification (NAS) (TM6002)

Flexible surfaces:

- Construction of unbound granular pavements layers (B2)
- In-situ stabilization of modified pavement layers (B5)
- Supply aggregate by weight (G2)
- Quality assurance level contracts (Q3/Q4)
- Chip sealing in New Zealand practice notes (April 2011)

Manuals:

- NZ guide to pavements structural design
- NZ guide to pavement evaluation and treatment design
- NZ supplement to the 2004 Austroroads pavement design guide
- RAMM – Road Condition Rating/Sealed Roads Manual

Future Demand

Future demand and growth in the district is addressed in our report Keeping New Plymouth Moving and Growing. This report includes Investment Logic Maps (ILMs) and a series of problem statements, benefits and investment KPIs for growth. These are summarised in the table below.

Table 4 Pavement growth investment KPIs

Problems	Benefits	Investment KPIs (PBC for each one)
• Capacity limitations of key and strategic arterial routes do not meet current demand and will not support future growth. • Natural landforms, arterial layout and poor alternative mode permeability are limiting city connectivity. • Complex roads and a high number of modal conflict points are driving high actual and perceived personal and collective risk. • A lack of viable alternative routes during a major event results in significant delays and risk of transport and utility severance.	• Improved transport network performance • Improved safety outcomes • Improved economic outcomes for the district • More viable transport choices	• Effectiveness • Network Availability • Improved Infrastructure Quality • Improved actual safety • Improved safety perception • Business investment • Transport network supports future growth • Increased use of alternative modes • Improved community perception • Improved alternative mode infrastructure

Note: All financial forecasts are shown in inflation adjusted dollar values.

2.1 Asset Description

The total length of the NPDC formed roading network is 1,277.5 km. This comprises 1,109.1 km (90.3%) of sealed roads and 168.5 km (9.7%) of unsealed roads. Of these, 321.7 km (25.2%) are classed as urban roads and 955.9 km (74.8%) are classed as rural roads. Table 5 shows the roading network by ONRC and surface categories.

Table 5 ONRC and surface categories

ONRC Category	Traffic Volume (AADT)	Structural AC (km)	Chipseal/ Slurry (km)	Unsealed (km)	Total (km)	Total (km)	Length %	Lane km	Lane km%
Arterial	Urban > 5000	0	15.5	0	15.5	15.5	1.20%	30	1.60%
Primary Collector	Urban > 3000	0	35.4	0	35.4	76.2	6.00%	71	3.70%
	Rural > 1000	0	40.8	0	40.8			81	4.30%
Secondary Collector	Urban > 1000	0	89.7	0	89.7	345.1	27.00%	179	9.40%
	Rural > 200	0	255.4	0	255.4			443	23.30%
Access Road	Urban < 1000	0.8	108.8	0	109.6	529.4	41.40%	216	11.30%
	Rural < 200	0	401.6	18.2	419.8			497	26.10%
Low Volume	Urban < 200	1.2	70.2	0.1	71.5	311.3	24.40%	136	7.10%
	Rural < 50	0	89.7	150.1	239.8			251	13.20%
Total Urban Roads		2	319.6	0.1	321.7	321.7	25.20%	632	33.20%
Total Rural Roads		0	787.5	168.3	955.8	955.8	74.80%	1272	66.80%
Total Roads		2	1107.1	168.4	1277.5	1277.5		1904	

In addition to formed roads, there are approximately 710 km of partly formed and/or unformed roads. We have adopted a policy for managing these unformed roads. This policy covers funding of improvements to unformed roads and the process for disposing of assets deemed surplus to requirements.

The New Zealand Walking Access Commission published a document in February 2011 titled 'Guidelines for the Management of Unformed Legal Roads'. This document is available for our use in administrating unformed roads. We have yet to complete a detailed survey and analysis of hazards, structures and occupation on unformed roads. Once this has been done, we will make recommendations to the Council on the best strategies to manage risks.

The roads are made up of a number of layers as show in Table 6.

Table 6 Road formation layers

Pavement Asset Group	Description
Road Formation	Cutting or filling of the natural ground/terrain to establish a suitable surface (subgrade) upon which the road is constructed
Sub-Base	Lower levels of metal construction, laid upon the sub grade
Base Course	Upper, high quality metal layer (typically about 100-150mm thickness)
Top Surface	Final layer or top surface of material over which vehicles pass, typically asphalt, chip seal or running course for unsealed roads

The data presented in this AMP on the quantity and type of the assets is classed as grade **B – Reliable** due to the asset inventory well maintained and updated in RAMM. There is requirement for a more efficient and accurate process for capturing data to ensure it is maintained to a high quality.
This is recorded as an action in Section 5 – Improvement and Monitoring Plan.

We also need to analyse any gaps and inaccuracies in our existing asset data in RAMM to ensure we have better and more accurate data for future asset management planning.
This is recorded as an action in Section 5 – Improvement and Monitoring Plan.

2.2 Asset Condition

As indicated in the data in Programme Business Case 6 – Network Audits of Condition, the general conditionof our pavements is good. The particular measures used are shown in Table 7.

Table 7 Network Audit of Condition KPIs

KPI No	KPI	Baseline Performance	Target Performance
6.1	ONRC Amenity Customer Outcome 1 – Smooth Travel Exposure	84.3% Arterial, 91-93% Others	85% for Arterial roads and 90% for all other categories.
6.2	ONRC Amenity Customer Outcome 2 – Peak Roughness	TBC	TBC
6.4	Pavement Integrity Index (PII),	95.8% average 2005-15	>= 95% to prevent roads deteriorating to unacceptable standard.
6.5	Condition Index (CI)	98.4% average 2005-15	>= 98% to prevent roads deteriorating to unacceptable standard.

NPDC roads have relatively low traffic volumes compared to other RCAs and failure due to wear only occurs in high stress areas. Typically this is at points where heavy vehicles turn at intersections in industrial areas and at cul-de-sac heads. The main failure mode for chipseal surfaces is aging. This occures when oxidation of the bitumen causes it to harden which acceleratates cracking, chip loss and flushing/loss of texture when further compacted by traffic loading.

The data presented in this AMP on the condition of the assets is classed as grade **B – Reliable** due to our regular condition inspections and recording and updating of results in the RAMM asset inventory.

2.3 Asset Remaining Lives

The age profile of the District's pavements is shown in the graph in Figure 1.

Road surface ages by ONRC road category are shown in the graphs in Figures 2 – 9.

Figure 1 Pavement age profile

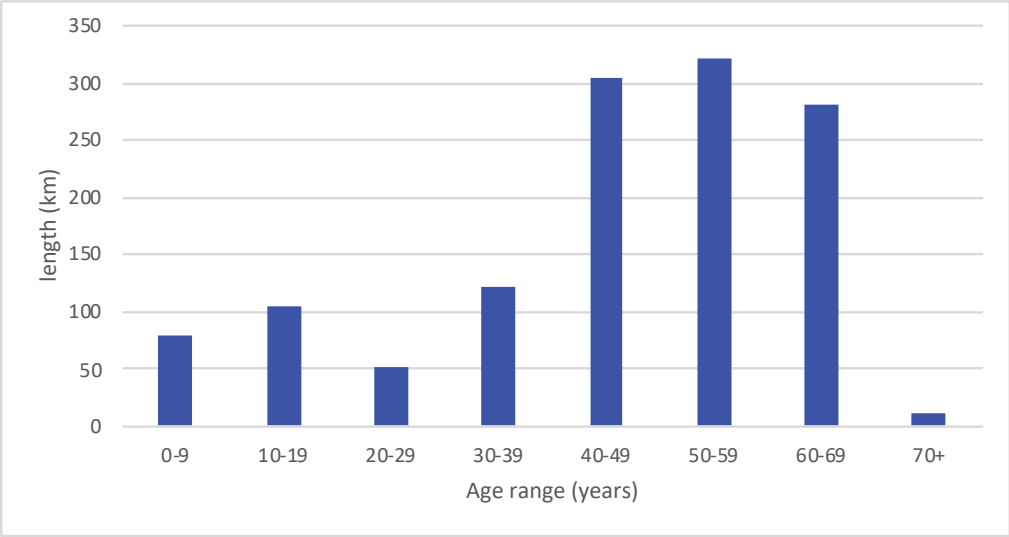

Figure 2 Urban arterial surface ages

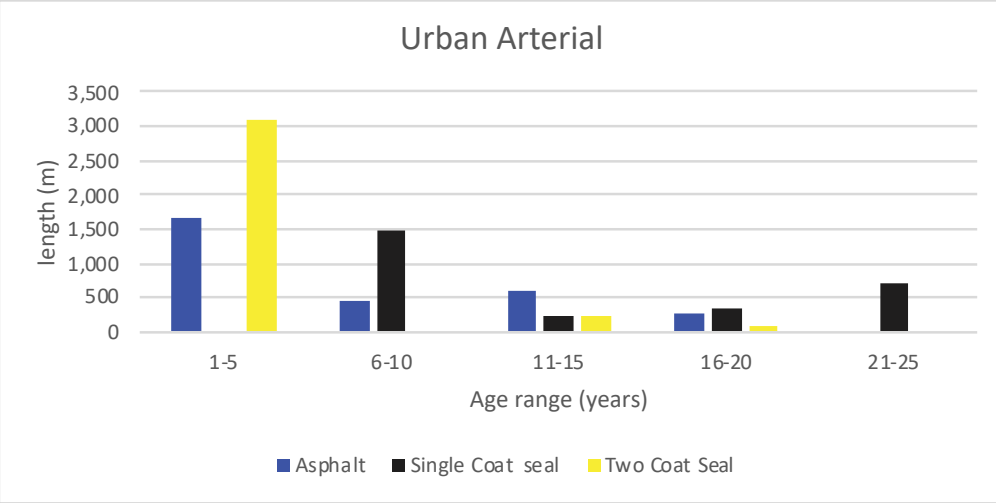

Figure 3 Urban primary collector surface ages

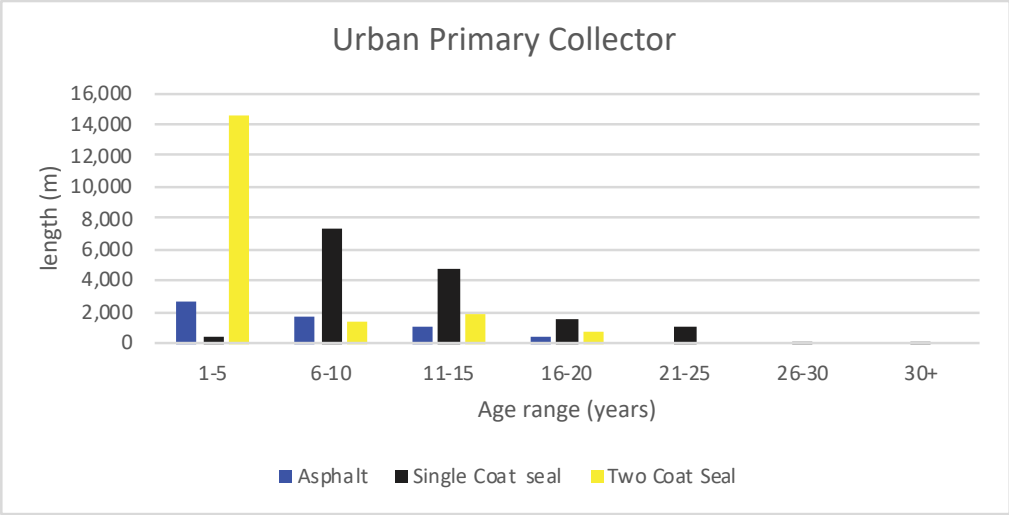

Figure 4 Rural primary collectors surface ages

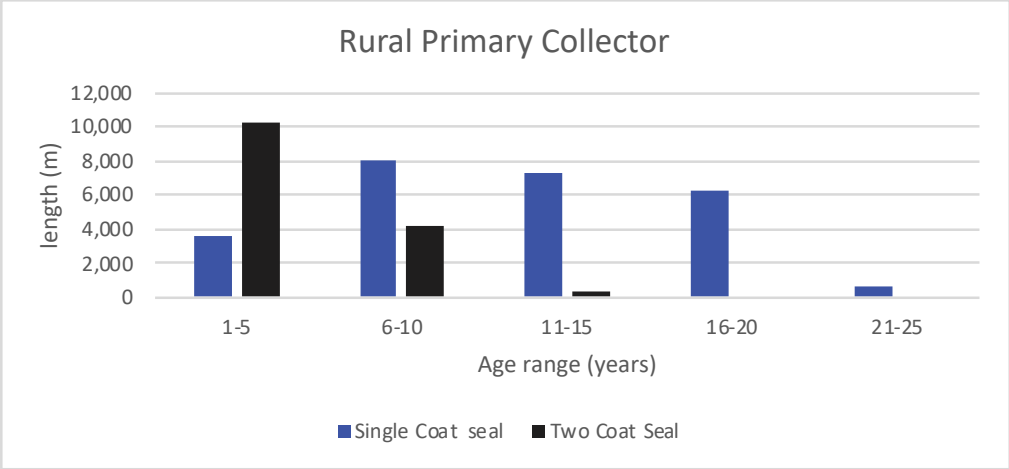

Figure 5 Urban secondary collector surface ages

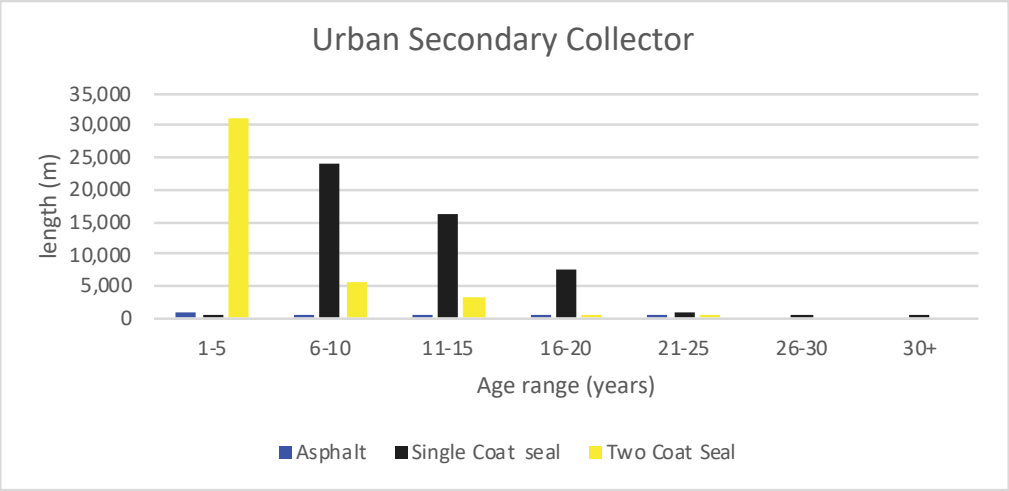

Figure 6 Rural secondary collector surface ages

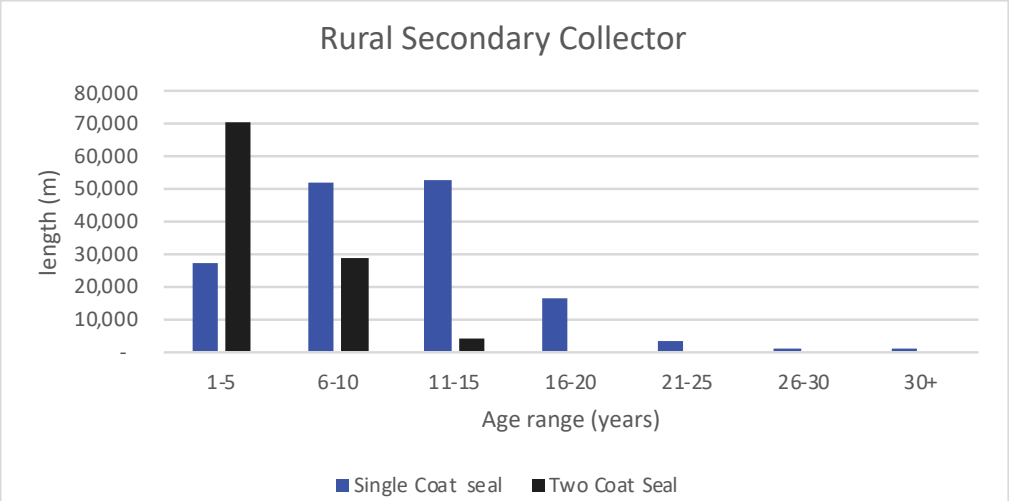

Figure 7 Urban access surface ages

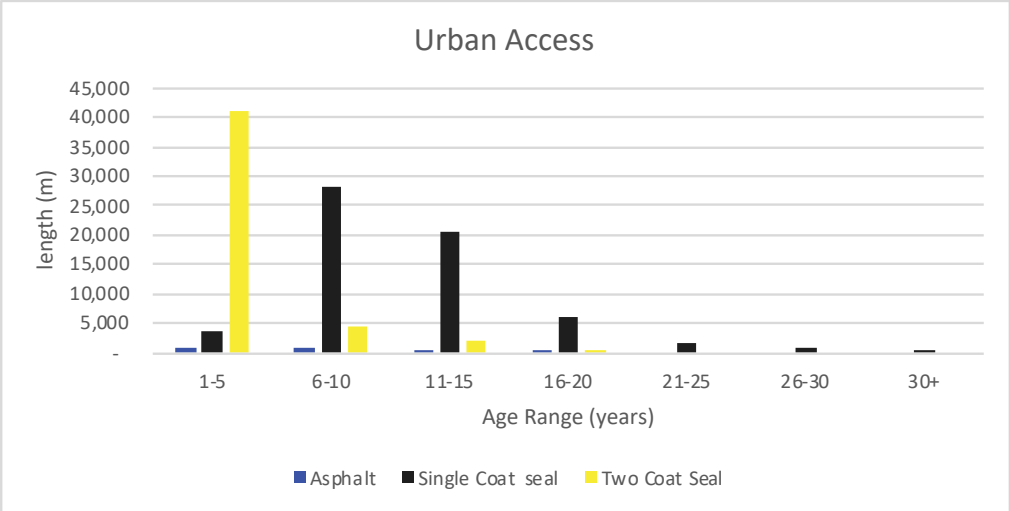

Figure 8 Urban low volume surface ages

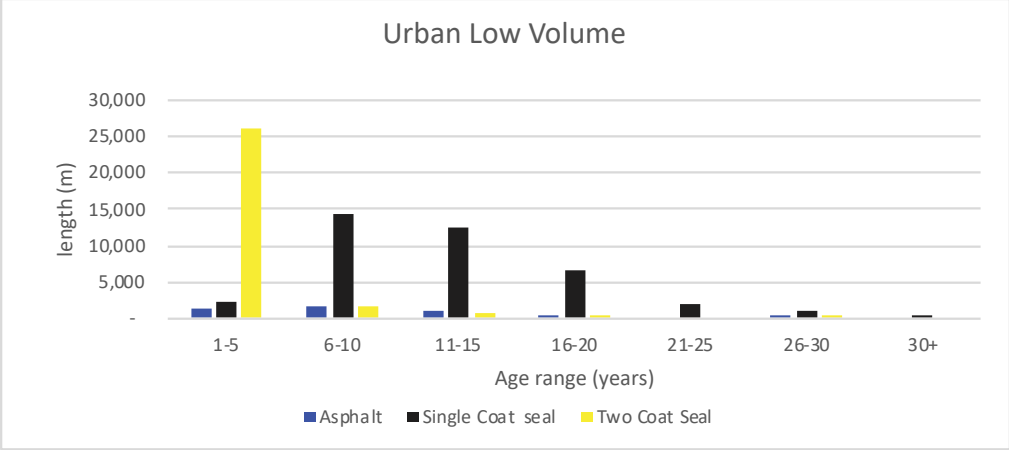

Figure 9 Rural low volume surface ages

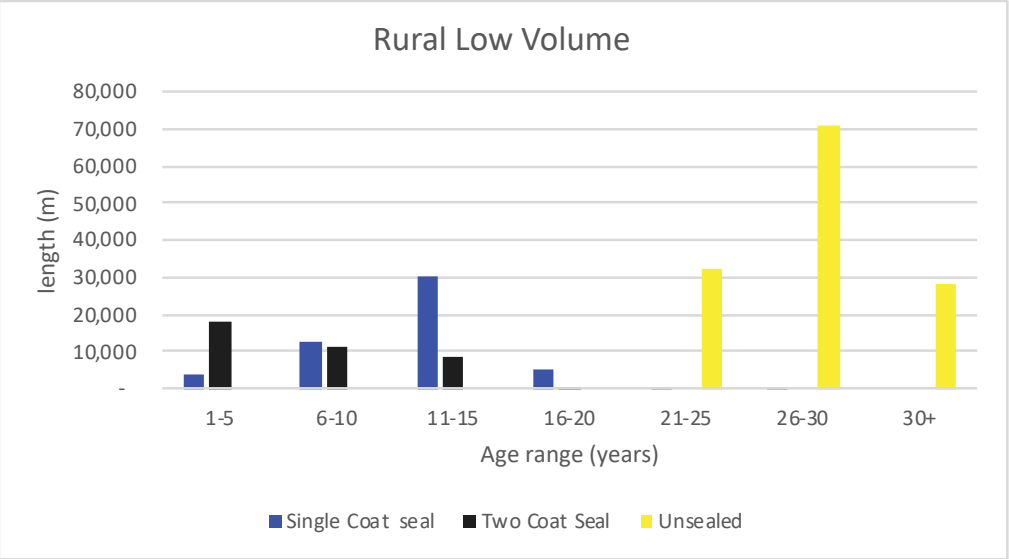

Table 8 shows the average age of sealed surfaced when resurfaced.

Table 8 Average age when resurfaced

Row Labels	Asphalt	Single Coat Grade 2	Single Coat Grade 3	Single Coat Grade 4	Single Coat Grade 5	Single Coat Grade 6	Two Coat Grade 2 & 4	Two Coat Grade 3 & 4	Two Coat Grade 3 & 5	Two Coat Grade 4 & 6	Unsealed
Arterial	6	n/a	16	18	21	6	n/a	n/a	6	2	n/a
Primary Collector	8	n/a	14	15	10	9	8	n/a	7	7	37
Secondary Collector	6	28	13	14	11	9	7	n/a	5	4	26
Access	7	13	14	14	10	9	8	n/a	5	3	27
Low Volume	7	11	14	16	11	9	9	16	7	2	28

An NPDC Pavement Management Strategy (PMS) document that included analysis using dTIMS conducted in the early 2000s indicated that average chipseal life was in the 12-13 year range. This broadly aligned NZTA's 'Chip Sealing in New Zealand 2005 – Chapter 4 Typical Chip Seal Performance' shown in Figure 10.

Figure 10 Default seal lives

Table 4-4 Default seal lives for different traffic levels, based on typical New Zealand pavements, and proposed for use in designing pavements.

Surfacing Type	Use 1 (<100 vpd)	Use 2 (100 - 500 vpd)	Use 3 (500 - 2,000 vpd)	Use 4 (2,000 - 4,000 vpd)	Use 5 (4,000 - 10,000 vpd)	Use 6 (10,000 - 20,000 vpd)	Use 7 (>20,000 vpd)
	Life in Years						
Voidfill Seals							
Grade 6	6	5	4	3	2	1	1
Grade 5	8	7	6	5	4	3	2
Grade 4	12	10	8	7	6	5	4
Grade 3	14	12	10	9	8	7	6
First Coat Seals							
Grade 5	1	1	1	1	1	1	1
Grade 4	3	2	1	1	1	1	1
Grade 3	4	3	2	1	1	1	1
Grade 4/6	6	4	3	2	2	1	1
Grade 3/5	8	6	5	4	3	2	1
Grade 2/4	10	8	6	5	4	3	2
Reseals							
Grade 5	8	7	6	5	4	3	2
Grade 4	12	10	8	7	6	5	4
Grade 3	14	12	10	9	8	7	6
Grade 2	16	14	12	11	10	9	8
Grade 4/6	14	12	10	9	8	6	4
Grade 3/5	16	14	12	11	10	8	6
Grade 2/4	18	16	14	13	12	10	9

RAMM and Asset Management are discussed in Chapters 1, 3 and 5.

However, the recent flat lining of NZTA budgets combined with NPDC commitments to set minimal rates rises means that the actual rate of chipseal resealing we can achieve within annual budgets is at an average interval of 17 years.

A well maintained and updated asset inventory (RAMM) means that the data presented in this AMP on the age of the assets is classed as grade **B – Reliable**.

2.4 Asset Valuation

The value of the pavement assets as assessed during the 3-yearly statutory valuation in 2016 is shown in the table below.

Table 9 Asset valuation

Category	Gross Current Replacement Cost (GCRC) ($)	Annual Depreciation ($)	Optimised Depreciated Replacement Cost (ODRC) ($)
Road Formation	171,672,553	-	171,672,553
Sub-Base	117,507,887	411,280	86,664,578
Base Course	124,543,528	1,556,794	62,271,764
Top Surface	56,633,930	4,080,091	23,237,587
Total	470,357,898	6,048,165	343,846,482

The total value of the Transportation assets is $1,357m which includes $579m for the value of the land making up the road corridor. The pavement value of $470m represents 35% of the total value and 60% of the total installed asset value i.e. excluding land.

Our well maintained and updated asset inventory (RAMM), the availability of good information on applicable unit rates and an external peer review of the valuation by Beca means the data presented in this AMP on the value of the assets is classed as grade **B – Reliable.**

2. LIFECYCLE MANAGEMENT PLAN

2.5 Operations and Maintenance

Routine sealed pavement maintenance includes the following activities.

- Pothole repairs
- Edge break repairs
- Crack filling
- Minor surface levelling
- Surface defect remediation
- Dig outs
- Adjustment of service surface chambers/boxes
- Grading, repairing and metalling unsealed roads
- Pre-seal repairs[1]
- Cycle lane maintenance/cleaning
- Minor storm event remediation including first response and renewal of damaged assets
- Network and asset management including inspections and upkeep of inventory systems

We prioritise and schedule pavement maintenance requirements based on detailed monthly inspections by our contractors. The contractors are responsible for identifying faults on the network and completing work within budget allocations and target response times.

To ensure the network condition is safe, fit-for-purpose and meets customer satisfaction targets, we will need to continue to maintain the road network at the same level as the approved 2015-18 NLTP budgets during the 2018-21 NTLP and beyond.

Our target cost for overall maintenance (including renewals but excluding emergency works) is <= $10,000/km/annum. For the 1,278km of maintained roading network this would require total expenditure of $12,780,000 per annum.

The 2015-18 NLTP approved budgets, 2018-21 NLTP forecasts and 10-year forecasts for the work categories associated with pavement maintenance are shown in Tables 10 – 19 for work categories 111, 112, 121, 140 and 151.

1 Pre-reseal repairs are included in Routine Pavement Repairs

Table 10 WC111 sealed pavement maintenance 2015-18 NLTP

Year	Requested Allocation			Approved allocation (NZTA only)			
	Routine pavement repairs	Pre-reseal repairs	Total cost	Total cost for approval ($)	FAR	NZTA Share	Funding source National
2015/16	1,871,900	0	1,871,900	1,847,584	52	960,744	960,744
2016/17	1,871,900	0	1,871,900	1,950,488	51	994,749	994,749
2017/18	1,871,900	0	1,871,900	2,150,995	51	1,097,007	1,097,007
Totals	5,615,700	0	5,615,700	5,949,067	51	3,052,500	3,052,500

Table 11 WC111 sealed pavement maintenance 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Routine pavement repairs	1,998	2,038	2,083	2,128	2,175	2,225	2,276	2,331	2,389	2,449
Pre-seal repairs	0	0	0	0	0	0	0	0	0	0
Total Cost	1,998	2,038	2,083	2,128	2,175	2,225	2,276	2,331	2,389	2,449
NZTA Share FAR (51%)	1,019	1,039	1,062	1,085	1,109	1,135	1,161	1,189	1,218	1,249

The 2018-21 NLTP total of $6,118k is similar to the amount approved in the 2015-18 NLTP which was $5,949k. The network has to meet the needs of the region's oil and gas industry, the growth in chicken farming and increasing forestry activity.

Note: The expenditure required for pre-seal repairs is included in the total for routine pavement maintenance.

Table 12 WC112 Unsealed pavement maintenance 2015-18 NLTP

Year	Requested Allocation	Approved allocation (NZTA only)			
	Total Cost ($)	Total cost for approval ($)	FAR (%)	NZTA Share ($)	Funding source: National ($)
2015/16	71,000	60,423	52	31,420	31,420
2016/17	71,000	57,087	51	29,114	29,114
2017/18	71,000	71,000	51	36,210	36,210
Totals	213,000	188,510	51	96,744	96,744

Table 13 WC112 Unsealed pavement maintenance 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Unsealed pavement maintenance	67	69	70	72	73	75	77	79	81	83
NZTA Share FAR (51%)	34	35	36	37	37	38	39	40	41	42

Table 14 WC121 Environmental maintenance 2015-18 NLTP

Year	Requested Allocation				Approved allocation (NZTA only)			
	Vegetation control ($)	Winter maintenance activities ($)	Other environmental maintenance ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	360,000	0	125,000	485,000	490,626	52	255,126	255,126
2016/17	360,000	0	125,000	485,000	484,411	51	247,050	247,050
2017/18	360,000	0	125,000	485,000	500,000	51	255,000	255,000
Totals	1,080,000	0	375,000	1,455,000	1,475,037	51.33	757,176	757,176

Table 15 WC121 Environmental maintenance 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Vegetation control	378	386	394	403	412	421	431	441	452	464
Other Environment Maintenance	126	129	131	134	137	140	144	147	151	155
Total Cost	504	515	525	537	549	561	575	588	603	619
NZTA Share FAR (51%)	257	263	268	274	280	286	293	300	308	316

Table 16 WC140 Minor events 2015-18 NLTP

Year	Requested allocation	Approved allocation (NZTA only)			
	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	582,825	0	52	0	0
2016/17	582,825	224,937	51	114,718	114,718
2017/18	582,825	582,825	51	297,241	297,241
Totals	1,748,475	807,762	51	411,959	411,959

Table 17 WC140 Minor events 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Minor events (RD1012)	505	515	526	537	549	562	575	589	603	618
NZTA Share FAR (51%)	258	263	268	274	280	287	293	300	308	315

Note: there is an increase from the $0.807m approved for environmental maintenance in the 2015-18 NLTP. However, the increase is in line with $1.748m allocation requested at that time. Increased funding is required to due to climate change and an increase in the frequency of severe weather events resulting in increased responses to minor events on the network.

Table 18 WC151 Network and asset management 2015-18 NLTP

Year	Requested Allocation				Approved allocation (NZTA only)			
	Network management (incl inspections) ($)	Network user information ($)	Management of asset inventory systems ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	1,215,223	0	135,000	1,350,223	1,235,950	52	642,694	642,694
2016/17	1,222,783	0	135,000	1,357,783	1,143,071	51	582,966	582,966
2017/18	1,219,408	0	135,000	1,354,408	1,100,000	51	561,000	561,000
Totals	3,657,414	0	405,000	4,062,414	3,479,021	51.36	1,786,660	1,786,660

Table 19 WC151 Network and asset management 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Network management	1,075	1,096	1,120	1,145	1,170	1,197	1,224	1,254	1,285	1,317
Network user information	-	-	-	-	-	-	-	-	-	-
Management of inventory systems	136	139	142	145	148	152	155	159	163	167
Total Cost	1,211	1,235	1,262	1,290	1,318	1,349	1,379	1,413	1,448	1,484
NZTA Share FAR (51%)	618	630	644	658	672	688	703	721	738	757

Note: the 2018-21 NLTP annual values requested for network management have decreased. This is due to achieving savings in consultant costs as a result of changes to our Professional Services contract with Opus.

2. LIFECYCLE MANAGEMENT PLAN

The total forecast expenditure for maintenance (including Special Roads) is shown in Table 20.

Table 20 Maintenance expenditure forecast

Activity	WC	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Total
Sealed pavement maintenance	111	2,008	2,048	2,093	2,138	2,185	2,237	2,288	2,343	2,401	2,461	22,313
Unsealed pavement maintenance	112	67	69	70	72	73	75	77	79	81	83	856
Environmental maintenance	121	511	522	532	545	557	569	583	596	611	628	5,775
Minor Events	140	505	515	526	537	549	562	575	589	603	618	5,719
Network and Asset Management	151	1,211	1,235	1,262	1,290	1,318	1,349	1,379	1,413	1,448	1,484	13,540
Total		4,302	4,389	4,483	4,582	4,682	4,792	4,902	5,020	5,144	5,274	47,568

The total NZTA subsidies forecast for maintenance (including Special Roads) is shown in Table 21.

Table 21 Maintenance NZTA subsidy forecast

Activity	WC	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Total
Sealed pavement maintenance	111	1,027	1,048	1,071	1,094	1,118	1,145	1,171	1,199	1,228	1,259	11,358
Unsealed pavement maintenance	112	34	35	36	37	37	38	39	40	41	42	380
Environmental maintenance	121	263	268	274	281	287	293	300	307	314	323	2,909
Minor Events	140	258	263	268	274	280	287	293	300	308	315	2,845
Network and Asset Management	151	618	630	644	658	672	688	703	721	738	757	6,828
Total		2,200	2,244	2,292	2,342	2,394	2,450	2,506	2,566	2,630	2,696	24,320

The overall Opex forecast for Transportation activities including operations and maintenance is included in the Transportation Strategic Case (General Volume).

2.6 Renewals Plan

2.6.1 Selection of Assets for Resurfacing and Rehabilitation

We take a number of factors into account to determine our annual sealed road resurfacing and rehabilitation programme including:

- Age of construction existing sealed surface
- Traffic volume and type
- Geometry and use of road
- Road classification and overall performance of that road classifications against the ONRC measures
- Condition based on the ratings survey data and any previous repairs
- Roughness based on the roughness survey data
- Visual inspection to confirm the indicated condition from the data
- Expected contract rates and available budget for the works
- The proximity of other sections of road that may require resurfacing in the near future

Where we find that the base course and sub-base have caused surface failure we will base some selections for rehabilitation on priority.

We select our annual rehabilitation programmes 12 months in advance. This allows us to complete any pre-work and preparation needed prior to resealing to ensure the new surface is not adversely affected by other road features. For example, we would replace things such as a broken kerb and channel prior to resealing.

We identify and prioritise the treatment selection for a road using the data recorded in RAMM; its age, roughness, and the number of pothole repairs undertaken, and its ORNC classification. Data selection in RAMM is based in the RAMM Treatment Selection Workshop (V3.7) process to determine years 1-3 of the renewals programme. Data validation includes:

- ONRC (Carriageway)
- Maintenance values (Maintenance Cost)
- Reseal history (Carriageway Surface)
- Updates NAASRA (Roughness)
- Update ADDT
- Condition Rating (Rating Sealed)
- TSA (use: 2017 Test BCR8)

After we have run the V3.7 process, we carry out site inspections to confirm the pavement selection programme.
We have determined Years 4-10 of the renewal programme by analysing a data set extracted from RAMM, using the following criteria:

- Faults were ranked in order of severity from worst to least bad (shoving, rutting, alligator cracking, potholes, longitudinal and transverse cracking, scabbing and flushing)
- The proportion of faulting was scaled up from the percentage assessed over the total road length.
- Roads with shoving or rutting, alligator cracking and potholes that were assessed for General Maintenance by the TSA were then extracted to be included in the site inspection list.

The criteria for the pavement improvement are shown in Table 22.

Table 22 Pavement improvement criteria

Work Type	Objective	Defects on the Road	Methods
Resealing / Resurfacing	To maintain a waterproof and skid resistant road surface.	High roughness. Shows integrity in the basecourse.	Chip seal: layer of sprayed hot bitumen or emulsified bitumen covered with a layer of stone chips, with the amount of bitumen being altered according to the chip size and other factors.
			Slurry seal: mixture of fine aggregate and emulsified bitumen laid ~6 mm thick.
			Friction course: mix of asphaltic binder and graded aggregate with hydrated lime filler which has a high volume of air voids and is laid in a 30 - 35mm layer.
			Asphaltic concrete: normally paver laid asphaltic binder and graded aggregate mix, typically laid at 25-40mm thickness.
Strengthening	Strengthen road subbase and/or base course.	High roughness, close pothole repairs in the same length of road.	Reconstruction: remove the existing base course and/ or sub-base and replace with new material.
			Renovation: increase the strength of existing base course / sub-base materials, possibly by adding a stabiliser (hydrated lime or cement) and re-compacting.
			Granular overlay: involves construction of an additional "thick" (100-200mm) layer of road metal on top of the existing pavement construction. May include ripping of existing surface.
Smoothing	Smooth irregularities in road surfaces where the structural condition of the carriageway is sound.	Smooth surface and irregularities.	The materials used depend on traffic volumes / road geometry and road condition, typically an additional "thin" (50-100mm) layer of road metal, asphaltic concrete, friction course, or premix.
			Rip and remake / recycle: forms of renovation, but with little additional strength.
			Mill and replace: typically bituminous pavements only with the same surface type replaced, with little increase in strength.

When selecting the material to be used for top surfacing, we consider the following factors:

- Condition and texture of the surface and the size of the existing chip.
- Skid resistance and safety.
- Need for waterproofing.
- ORNC classification, percentage of HGVs, and road geometry (e.g. chip seal can be inappropriate in high stress areas).
- The flexibility of the existing road formation.
- The proximity of dwellings to the carriageway and the potential for noise nuisance. Amenity value (e.g. the major CBD areas).

A review of skid resistance issues is required in consideration of intersection□related crashes, wet weather crashes and crashes where the road has been identified as being a contributing factor to the crash. **This is recorded as an action item in Section 5 – Improvement and Monitoring Plan.**

We do plan to investigate the deployment of dTIMS to optimise asset renewal planning in the future. **This is recorded as an action item in Section 5 – Improvement and Monitoring Plan.**

2.6.2 Sealed Road Resurfacing Local Roads

The approved 15-18 NLTP values for work category 212 – Sealed Road resurfacing for local roads are shown in Table 23.

Table 23 WC212 Sealed Road resurfacing 2015-18 NLTP

Year	Requested Allocation			Approved allocation (NZTA only)			
	Chip sealing ($)	Thin asphaltic surfacing ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	2,537,000	531,000	3,068,000	2,815,636	52	1,464,131	1,464,131
2016/17	2,537,000	531,000	3,068,000	2,300,902	51	1,173,460	1,173,460
2017/18	2,537,000	531,000	3,068,000	3,500,000	51	1,785,000	1,785,000
Totals	7,611,000	1,593,000	9,204,000	8,616,538	51.33	4,422,591	4,422,591

To prevent assets from deteriorating to an unacceptable condition and to meet the customer satisfaction targets set out in the Programme Business Cases, we will need to continue resurfacing sealed roads during the 18-21 NLTP and beyond at the same level approved in the 15-18 NLTP. We do aim to improve roading performance at this level of investment by being more targeted in the roads we select for resurfacing, as detailed in section 2.6.1. This includes resealing CBD surfaces and selected locations on Arterial roads, Primary Collector roads with cycle lanes, and high wear areas such as heavy vehicle turning areas with thin asphaltic surfacing at the same rates approved in the 15-18 NLTP.

The proposed 18-21 NLTP values and the 10-year forecast for expenditure on sealed road resurfacing are shown in Table 24.

Table 24 WC212 Sealed Road resurfacing 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Chip sealing	2,321	2,367	2,419	2,472	2,527	2,585	2,644	2,708	2,775	2,845
Thin asphaltic surfacing	696	734	738	754	770	775	810	829	850	874
Total Cost (RD1002)	3,017	3,101	3,157	3,226	3,297	3,360	3,454	3,537	3,625	3,719
NZTA Share FAR (51%)	1,538	1,581	1,610	1,645	1,681	1,713	1,761	1,804	1,849	1,897

Allocating $2.3m/year for resurfacing with chipseal allows for approximately 66 km/year (or approximately 6% of the total sealed road length) assuming an average road width of 7m and achieving a target cost of $5/m^2. This represents a resurfacing interval of just under 17 years. Allocating $0.7m/year for resurfacing with thin asphaltic surfacing allows for approximately 1,100m/year, assuming an average road width of 10m and achieving a target cost of 60/m^2.

The Long Term Plan includes a Department of Internal Affairs mandated Level of Service to show the percentage of the sealed local road network that is resurfaced each year. For the 2018-2028 LTP this is set at 5.7%. This equates to targeting resurfacing on a 17.5 year cycle. The values included in the above table correlate with this Level of Service and ensure we will meet the target and maintain sealed road surfaces to the acceptable and safe standard expected and accepted by the community.

2.6.3 Unsealed Road Metalling

The approved 15-18 NLTP values work category 211 – Unsealed Road metalling for local roads are shown in Table 25.

Table 25 WC211 Unsealed road metalling 2015-18 NLTP

Year	Requested Allocation		Approved allocation (NZTA only)			
	Unsealed road metalling and rehabilitation ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA Share ($)	Funding source: National ($)
2015/16	410,000	410,000	336,281	52	174,866	174,866
2016/17	410,000	410,000	389,247	51	198,516	198,516
2017/18	410,000	410,000	410,000	51	209,100	209,100
Totals	1,230,000	1,230,000	1,135,528	51	582,482	528,482

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To prevent assets from deteriorating to an unacceptable condition and to meet the customer satisfaction targets set out in the Programme Business Cases we will need to continue with unsealed road metalling throughout the 2018-21 NLTP and beyond at a similar level to that approved in the 2015-18 NLTP.

Our target cost for metalling unsealed road is $2,300/annum/km of unsealed road. To metal the 169km of unsealed road requires a total amount of $390k/annum. Based on previous unsealed road metalling rates this will allow approximately one third of the lane/km of the unsealed road network to be metalled each year.

The proposed 18-21 NLTP values and the 10-year forecast for expenditure on unsealed road metalling is shown in Table 26.

Table 26 WC211 Unsealed road metalling 2018-21 NLTP

	2018-21 NLTP									
$000	**18/19**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**	**24/25**	**25/26**	**26/27**	**27/28**
Unsealed road metalling (RD1001)	432	444	452	462	473	482	495	507	520	533
NZTA Share FAR (51%)	221	227	231	236	241	246	252	259	265	272

2.6.4 Sealed Road Pavement Rehabilitation

The approved 15-18 NLTP values work category 214 – Sealed road pavement rehabilitation are shown in Table 27.

Table 27 WC214 Sealed road rehabilitation 2015-18 NLTP

Year	Requested Allocation			Approved allocation (NZTA only)			
	Structural AC rehabilitation ($)	Granular pavement rehabilitation ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	-	1,114,000	1,114,000	672,064	52	349,473	349,473
2016/17	-	1,114,000	1,114,000	1,251,928	51	638,483	638,483
2017/18	-	1,114,000	1,114,000	1,114,000	51	568,140	568,140
Totals	-	3,342,000	3,342,000	3,037,992	51	1,556,096	1,556,096

To ensure sub-base and base course structures are renewed where required and to meet customer satisfaction targets we will need to continue the rehabilitation of sealed roads at a rate similar to the approved 2015-18 NLTP budgets during the 2018-21 NTLP and beyond.

Our target cost for sealed road rehabilitation is $1000/ annum /km of sealed road. For the 1,109km of sealed road a total amount of $1,109k/annum would be required.

Recent evaluations of whole-of-life costs have proven that structural AC roads provide better long term value than roads with granular construction. Therefore, we have re-balanced the allocations between structural AC and granular pavement rehabilitation and included an additional $250k per annum. This is to progressively rehabilitate any chip sealed Arterial or Primary Collector roads carrying >10,000 vehicles per day with structural asphalt. With just under 5km of roads in this category, the additional allowance of $250k/ annum will be sufficient to rehabilitate half of these roads over the next 10 years.

The proposed 2018-21 NLTP values and the 10-year forecast for expenditure on sealed road resurfacing are shown in Table 28.

Table 28 WC214 Sealed road rehabilitation 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Structural AC rehabilitation	1,010	1,031	1,052	1,076	1,100	1,125	1,152	1,180	1,210	1,241
Granular pavement rehab	362	369	378	386	394	403	413	423	433	444
Total Cost (RD1004)	1,372	1,400	1,430	1,462	1,494	1,528	1,565	1,603	1,643	1,685
NZTA Share FAR (51%)	700	714	730	746	762	779	798	817	838	860

2.6.5 Special Roads (SPR)

We will need to continue to maintain, operate and renew the section of Egmont Road leading to the North Egmont visitor centre in the National Park that is classed as special road.

The approved 15-18 NLTP values work category 111 – Sealed pavement maintenance for special roads are shown in Table 29.

Table 29 WC111 Sealed pavement maintenance special roads 2015-18 NLTP

Year	Requested Allocation			Approved allocation (NZTA only)			
	Routine pavement repairs ($)	Pre-reseal repairs ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA Share ($)	Funding source: National ($)
2015/16	10,000	0	10,000	2,3673	100	23,673	23,673
2016/17	5,000	5,000	10,000	7721	100	7721	7,721
2017/18	5,000	5,000	10,000	5,3387	100	53,387	53,387
Totals	20,000	10,000	30,000	8,4781	100	84,781	84,781

The approved 15-18 NLTP values work category 121 – Environmental maintenance for special roads are shown in Table 30.

Table 30 WC121 Environmental maintenance special roads 2015-18 NLTP

Year	Requested Allocation				Approved allocation (NZTA only)			
	Vegetation control ($)	Winter maintenance activities ($)	Other environmental maintenance ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	7,000	5,000	0	12,000	1,935	100	1,935	1,935
2016/17	7,000	5,000	0	12,000	82	100	82	82
2017/18	7,000	5,000	0	12,000	12,000	100	1,2000	12,000
Totals	21,000	15,000	0	36,000	14,017	100	1,4017	1,4017

The approved 15-18 NLTP values work category 212 – Sealed road resurfacing for special roads are shown in Table 31.

Table 31 WC212 Sealed road resurfacing special roads 2015-18 NLTP

Year	Requested Allocation			Approved allocation (NZTA only)			
	Chip sealing ($)	Thin asphaltic surfacing ($)	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	-	-	-	-	100	-	-
2016/17	36,000	-	36,000	3,202	100	3,202	3,202
2017/18	36,000	-	36,000	36,000	100	36,000	36,000
Totals	72,000	-	72,000	39,202	100	39,202	39,202

We do require further work to identify the specific sections of special roads that will require resurfacing, but we predict that an overall annual investment level similar to that in the 2015-18 NLTP will be required.

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The proposed 2018-21 NLTP values and the 10-year forecast for expenditure on sealed road resurfacing are shown in Table 32.

Table 32 Special roads expenditure forecast 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Sealed pavement maintenance (111) – routine pavement repairs	5	5	5	5	5	6	6	6	6	6
Sealed pavement maintenance (111) – pre-seal repairs	5	5	5	5	5	6	6	6	6	6
Environmental maintenance (121) – vegetation control	7	7	7	8	8	8	8	8	8	9
Environmental maintenance (121) – winter maintenance	5	5	5	5	5	6	6	6	6	6
Sealed road resurfacing (212) – chip sealing	13	13	14	14	14	15	15	15	16	16
Total Cost	35	36	37	38	38	39	40	41	42	43
NZTA Share FAR (91.83%, 83.67%, 75.5%)	32	30	28	28	29	30	30	31	32	33

We also plan to review and update asset maintenance standards to ensure we achieve the optimum balance between value and activities while meeting community expectations.
This is an improvement opportunity and is recorded as an action item in Section 5.

2.6.6 Renewals Expenditure Summary

The total forecast expenditure for renewals is shown in Table 33.

Table 33 Renewals expenditure forecast summary

Pavement Renewal - Expenditure Forecast ($000)												
Activity	NZTA code	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
Sealed Road Resurfacing (local road)	212	3,017	3,101	3,157	3,226	3,297	3,360	3,454	3,537	3,625	3,719	33,491
Sealed Road Resurfacing (special roads)	212	14	14	14	15	15	15	16	16	16	17	151
Sealed Road Pavement Rehabilitation	214	1,372	1,400	1,430	1,462	1,494	1,528	1,565	1,603	1,643	1,685	15,182
Unsealed Road Metalling	211	432	444	452	462	473	482	495	507	520	533	4,800
Total		4,835	4,959	5,054	5,165	5,278	5,385	5,529	5,662	5,804	5,955	53,625

The total NZTA subsidies forecast for renewals is show in Table 34.

Table 34 Renewals NZTA subsidy forecast

Pavement Renewal - NZTA Subsidy Forecast ($000)												
Activity	NZTA code	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
Sealed Road Resurfacing (local road)	212	1,538	1,581	1,610	1,645	1,681	1,713	1,761	1,804	1,849	1,897	17,080
Sealed Road Resurfacing (special roads)	212	12	12	11	11	11	11	12	12	12	13	117
Sealed Road Pavement Rehabilitation	214	700	714	730	746	762	779	798	817	838	860	7,743
Unsealed Road Metalling	211	221	227	231	236	241	246	252	259	265	272	2,448
Total		2,456	2,504	2,558	2,614	2,671	2,733	2,796	2,863	2,934	3,008	27,136

2.7 Acquisition and Augmentation Plan

Acquisitions

New assets installed by developers to serve new domestic and non-domestic developments are usually vested in us. Assets are built to the NZS4404: 2010 – Land Development and Subdivision Standard. Our specific requirements are defined in the New Plymouth District Council (NPDC) and South Taranaki District Council (STDC) adopted standard for Land Development and Subdivision Infrastructure, which is based on NZS 4404:2010 with local amendments. We assume full responsibility for any assets vested with us, and include them included in our operations, maintenance and future renewal plans.

Level of Service - Unsubsidised Works

A number of unsubsidised level of service projects are also planned throughout the 10-year forecast period. These are itemised in Table 35 with brief commentary.

Table 35 Level of service unsubsidised project

Project	Commentary
James Lane streetscape improvements (RD2023)	Improvement to enhance the CBD adjacent to the Huatoki Plaza.
Junction Road Improvements (RD1032)	This project applies the proceeds of the sale of the Junction Road Endowment Land Leasehold Properties to maintenance and improvement works on Junction Road (now Tarata Road) within the Inglewood area.
Roading resilience (RD2028)	Targeted investment to increase the resilience of roading assets in particular identified locations. Investment will make assets more resilient to natural hazards and provide more reliable roads for the community. This project may attract NZTA subsidies and will be discussed with NZTA in relation to the already approved 2018-21 NLTP subsidies.
HNZ Catalyst for Marfell (RD2029)	This project involves investment in roading assets that will act as a catalyst for HNZs proposed redevelopment and enhancement of the Marfell area.

The 10-year expenditure forecast for the unsubsidised projects, is shown in Table 36.

Table 36 Level of service expenditure forecast for unsubsidised projects

$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
James Lane streetscape improvements (RD2023)	252	-	-	-	-	-	-	-	-	-
Junction Road Improvements (RD1032)	212	216	221	226	231	235	242	247	254	260
Roading resilience (RD2028)	-	103	210	92	330	337	345	354	362	372
HNZ Catalyst for Marfell (RD2029)	182	412	-	-	-	-	-	-	-	-
Total	646	731	431	318	561	572	587	601	616	632

Growth - Subsidised Works

As described in the Strategic Case 'Keeping New Plymouth Moving & Growing', we have already commenced planning for the anticipated future growth of the district, identifying options for any required new/enhanced road components.

We will target low cost, safety, optimisation and resilience activities that contribute to the NZTA goals to:

a. reduce the number of deaths and serious injuries,
b. make better use of the local roading capacity, and
c. Increase resilience of the local roading network.

Typical minor improvement activities include the following:

- Seal Extensions (including dust coats)
- Minor Capacity Improvements (seal widening and carriageway widening)
- Minor Safety Improvements (line of improvements, intersection improvements, improved skid resistance, improved lighting and protection of vulnerable users)
- Minor Improved traffic management schemes
- Minor road resilience improvements

Increased activity from the oil and gas industry will require localised roading improvements. Contributions from these companies will provide added benefit to the local community and reduce the burden on budgets.

The approved 15-18 NLTP values work category 341 – Minor improvements are shown in Table 37.

Table 37 WC341 Minor improvements 2015-18 NLTP

Year	Requested allocation	Approved allocation (NZTA only)			
	Total cost ($)	Total cost for approval ($)	FAR (%)	NZTA share ($)	Funding source: National ($)
2015/16	1,086,000	988,873	52	514,214	514,214
2016/17	1,086,000	1,092,026	51	556,933	556,933
2017/18	1,086,000	1,177,101	51	600,322	600,322
Totals	3,258,000	3,258,000	51.3	1,671,469	1,671,469

We will need to continue with this level of expenditure for minor improvements to ensure the network remains safe and fit for purpose.

We plan to contribute to improvements at the junction at Wairau Road and South Road (SH45) in Oakura. This will facilitate safe and efficient traffic flows that are expected to increase as a result of a proposed sub-division development on Wairau Road. The estimated total cost of these improvement works is $1.0m and is forecast to be required in year 2022/23. A separate business case for this particular improvement will be submitted to NZTA when firm plans for the subdivision have been established. This will be based on an anticipated NZTA contribution towards 30% of the total cost.

The proposed 2018-21 NLTP values and the 10-year forecast for expenditure on minor improvements and other identified projects are shown in Table 38.

Table 38 WC341 Minor improvements 2018-21 NLTP

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Minor improvements – widening/safety (RD1005/1015)	1,007	1,038	1,055	1,079	1,102	1,122	1,155	1,183	1,213	1,244
Wairau/South Road (RD2003)	-	-	-	645	-	-	-	-	-	-
Total	1,007	1,038	1,055	1,724	1,102	1,122	1,155	1,183	1,213	1,244
NZTA Share FAR (51%)	514	529	538	879	562	572	589	603	618	635

One of the options under consideration is a second bridge crossing of the Waiwhakaiho River and new road links to the growth areas to the east of the city identified in the District Plan. Our approach to growth needs to be coordinated, and use models of the network and a programme of works. This will provide initial guidance and planning for any further programme of works to create an integrated multi modal transport network in the Bell Block/Smart road area. We estimate that in 2018/19 some $400k of unsubsidised Opex will be required for a planning study and to develop options for future consideration. The identified options will be discussed with NZTA and we will prepare and submit a separate business case when the timing of the preferred option has been established.

Passenger throughput at New Plymouth's airport is continuing to grow and combined with plans for growth in the areas adjacent to the existing Airport Drive, is likely to increase traffic flow in the area. There are already identified safety concerns regarding the operation of the Airport Drive/SH3 intersection. We have provisional plans to realign Airport Drive and to improve its intersection with SH3, at an estimated total cost total of $3.2m. Costs include developing a programme business case at $100k/year in 18/19 and 19/20 and construction at $3m in 21/22.

We plan to contribute to improvements at the junction at Smart Road and SH3 to facilitate safe and efficient traffic flows that are expected to increase as a result of the development of the Smart Road area. The estimated total cost of these improvement works is $3.53m and is forecast to be required in year 2025/26. A separate business case for this particular improvement will be submitted to NZTA when firm plans for the subdivision have been established. This will be based on an anticipated NZTA contribution towards 50% of the total cost.

The proposed 2018-21 NLTP values and the 10-year forecast for the **work category 324 – Road improvements** are shown in Table 39. These projects will be subject to the submission and approval of an individual business cases to NZTA.

Table 39 WC324 Road improvement projects

	2018-21 NLTP									
$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Smart Road/SH3 Intersection upgrade (RD2013)	-	-	-	-	-	-	-	3,535	-	-
Airport Dr/SH3 intersection (RD2001)	101	103	-	3,225	-	-	-	-	-	-
NZTA Share FAR (51%)	52	53	-	1,645	-	-	-	1,803	-	-

Growth - Unsubsidised Works

We also have a number of unsubsidised growth projects planned throughout the 10-year forecast period. These are itemised in Table 40 with brief commentary.

Table 40 Unsubsidised growth projects summary

Project	Commentary
Sub-division contributions – Area Q (RD1034)	This project is for NPDC to meet a cost share for roading improvements associated with subdivision activity within the district. Typically this will include new kerb and channel, new footpaths, and road widening. Within this project there is a funding allocation associated with the expected Council share of the roading cost linked with the development of Area Q at Bell Block.
Other sub-division contributions (RD1018)	This project is for NPDC to meet a cost share for roading improvements associated with subdivision activity within the district.
Land purchase for road widening (RD1017)	Provision of funding to purchase land for roading improvements.
Upper Carrington Road Widening (RD2022)	Provision for widening the road due to the increased volume of traffic caused by the ongoing development of the area.

The 10-year expenditure forecast for the unsubsidised growth projects is shown in Table 41.

Table 41 Unsubsidised growth projects expenditure summary

$000	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28
Sub-division contributions – Area Q (RD1034)	182	0	0	0	0	0	0	0	0	0
Other sub-division contributions (RD1018)	211	217	221	226	231	235	242	248	254	260
Land purchase for road widening (RD1017)	453	465	474	484	495	504	518	530	544	558
Upper Carrington Road Widening (RD2022)	0	0	145	148	151	155	158	162	166	170
Total	846	682	840	858	877	894	918	940	964	988

2.8 Disposal Plan

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required level of service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)

We do not plan to dispose of any pavement assets over the period of the AMP.

2.9 Annual Work Plan

Our renewals programme has been produced based on the selection methods described in section 2.6.1 and is stored in ECM at Transportation Renewals Programmes.

3. RISK MANAGEMNET PLAN

3.1 Critical Assets

All roads have been assessed and categorized into the ONRC road classification system. This system assesses the number of vehicles that use each section of road which provides a measure of criticality. The asset description in Section 2.1 provides details of the length of road in each ONRC category with the Arterial and Primary Collector Roads considered the most critical assets.

3.2 Risk Assessment

The NPDC risk management framework and details of key risks to Transportation assets are included in Section 14 of the Transportation Strategic Case (General Volume) and section 7 of the Asset Management Strategy.

3.3 Infrastructure Resilience Approach

We have commenced collecting data against the KPI: ONRC Resilience – Customer Outcome 2 – number of instances where road access is lost with no viable detour. We will analyse this data to determine opportunities to invest in improving resilience.

We also have a budget in place for reinstating access to any roads adversely affected by minor events such weather conditions, land instability or natural hazards. Any significant events causing major loss of access will be dealt with separately.

4. FINANCIAL SUMMARY

A summary of the expenditure forecasts included in this volume is shown in Table 42.

Table 42 Expenditure forecast summary

Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Total
Maintenance	4,302	4,389	4,483	4,582	4,682	4,792	4,902	5,020	5,144	5,274	47,570
Renewals	4,835	4,959	5,054	5,165	5,278	5,385	5,529	5,662	5,804	5,955	53,626
Service Level	646	731	431	318	561	572	587	601	616	632	5,695
Growth	1,954	1,823	1,895	5,807	1,979	2,016	2,073	5,658	2,177	2,232	27,614
Total	11,737	11,902	11,863	15,872	12,500	12,765	13,091	16,941	13,741	14,093	134,505

A summary of the NZTA contribution forecasts included in this volume is shown in Table 43.

Table 43 Subsidy forecast summary

Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Total
Maintenance	2,200	2,244	2,292	2,342	2,394	2,450	2,506	2,566	2,630	2,696	24,320
Renewals	2,456	2,504	2,558	2,614	2,671	2,733	2,796	2,863	2,934	3,008	27,137
Service Level											-
Growth	566	582	538	2,524	562	572	589	2,406	618	635	9,592
Total	5,222	5,330	5,388	7,480	5,627	5,755	5,891	7,835	6,182	6,339	61,049

Full details about overall Transportation operational expenditure are included in the Transportation Strategic Case (General Volume).

5. IMPROVEMENT AND MONITORING PLAN

Our general Asset Management Maturity Improvement Plan is included in the Asset Management Strategy.

The specific areas of improvement identified for pavements assets are listed in Table 44.

Table 44 Improvements summary

No	Improvement Area	Owner	Start Date	End Date
1	Implement improved processes for capturing new and updated asset data in RAMM for vested assets and by NPDC contractors.	Asset Operations Planning Lead	Jul-18	Jun-19
2	Conduct analysis of existing RAMM data to identify any gaps and inaccuracies and implement asset data quality improvement plan.	Asset Operations Planning Lead	Jul-19	Jun-20
3	Investigate plans to deploy dTIMS to optimize asset renewal planning.	Asset Operations Planning Lead	Ongoing	
4	Review and update asset maintenance standards to ensure balance between value and activities.	Manager Transportation	Jul-18	Jun-19
5	Review skid resistance performance data to identify where it could be improved in relation high sensitivity areas.	Asset Operations Planning Lead	Jul-19	Jun-20

2018-2028 TRANSPORTATION ASSET MANAGEMENT PLAN

He Rautaki Whakahaere Rawa mō Ngā Ara Kawenga

PAVEMENTS

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