NORTHLAND TRANSPORTATION ALLIANCE

Northland Transportation Alliance

Far North District Council Seal Extension Prioritisation Review

Prepared for Northland Transportation Alliance & Far North District Council

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Northland Transportation Alliance

Seal Extension Prioritisation Review

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EXECUTIVE SUMMARY

Hutchinson Consulting Engineers (Hutchinson) have been engaged by Northland Transportation Alliance (NTA) to undertake an independent review of the Dust Matrix prioritisation tool (2019) and methodology used to prioritise unsealed roads located within the Far North District.

As part of the seal extension matrix audit, the Northland Transport Alliance (NTA) selected six carriageways to be observed and validated against the dust matrix seal extension prioritisation tool. The six sites are noted below.

1. Otaua Road, Kaikohe
2. Rawhiti Road, Kawakawa
3. Motuti Road, Panguru
4. Parapara Road (Hill Section), Taipa
5. Henderson Bay Road, Henderson Bay
6. Purerua Road, Kerikeri

The Far North District encompasses an area of over 7,300km^2 and extends from Cape Reinga in the north around 175km south to the east-west district boundary between Whangarei and Kaikohe. As a result of its size, the topography of the Far North varies significantly throughout the district from low-lying coastal flats to gently rolling pasture in much of the north and south and steep farming and forestry land through the interior and pockets of the west coast.

The six sites selected by the NTA are a representative sample of the varied roading network through the Far North District with the nature of the carriageways varying to suit the environment. Otaua Road, Henderson Bay Road and Purerua Road typically comprising flat, open, well-shaped unsealed carriageways through flat to gently undulating farmland, while Motuti Road , Parapara Road and Rawhiti Road can be described as generally steeper, highly constrained carriageways.

We understand that in 2019, the Far North District Council and the Northland Transportation Alliance developed the dust matrix prioritisation tool to assist with the Council decision making process for prioritisation of investment for seal extensions. The dust matrix tool compares physical characteristics together with regional and local priority.

As part of the audit process the 'FNDC Road Prioritisation to Guide the Delivery of Road Asset Upgrades (Rev14)' spreadsheet was analysed and reviewed in order to validate the quality of the data used in the prioritisation process. There are nine primary attributes which affect the scoring of an individual carriageway and hence affect its prioritisation for sealing.

The quality of the data provided for the nine attributes varies greatly, with the majority of the attributes being inaccurate or missing from the scoring which results in misrepresentation of the carriageway attributes.

The highest weighted attribute is traffic volumes as not only is it the key dust generation factor, but also the most accurate attribute to quantify. We understand a comprehensive traffic count project was planned for the 2020/2021 summer season to specifically target anticipated traffic volume increases on forestry routes, tourist destinations and summer holiday routes.

The scoring of each attribute is based on the Whangarei District Council Seal Extension Guidelines. The guidelines are divided into two stages being the physical characteristics and the regional and local priority adjustment.

It is considered that the actual Dust Matrix Prioritisation Tool is generally fit for purpose and in line with the process followed by other local roading authorities for seal extension prioritisations, however its function is dependent on the quality of the data entered into it.

We have carried out our own assessment using the spreadsheet provided with data captured during our site specific observations and data sourced from FNDC RAMM information. We were unable to source information on road maintenance and road accidents therefore these values were left unchanged and there are minor variations between the FNDC and HCE assessments

From our assessment of the current seal extension prioritisation process and site specific data comparison we have compiled a list of recommendations and suggestions for FNDC to consider going forward.

- Each individual road section should be identified by the route position (RP) for clarity.

- Where there are significant traffic volume differences between a traffic count and a traffic estimate on the same road, priority should be made to ensure a traffic count is carried out on the estimated section to ensure an accurate ADT figure is assessed.

  Parerua Road was a good example where the first unsealed section between RP9578-10058m had a traffic count volume of 522 VPD and the next two sections beyond this relied on a traffic estimate of 104 VPD. We anticipate based on the number of amenities located at the end of this road that the traffic estimate may not be accurate.

- Logging and/or forestry operations should be included in the scoring assessment.

- Recommend including amenities that are accessed via the unsealed section not only when the amenity is located directly adjacent to the unsealed section. It appears that currently amenities are only included if they are located directly adjacent to the road section.

  Rawhiti Road is a good example where there are several amenities located at the northern end of the road however the two sections of unsealed carriageway are assessed as having little to no amenities.

- Recommend introducing an environmental factor to the scoring assessment. Roads located in low lying topography and adjacent to significant streams, wetlands and/or marine environments should be reflected in the scoring. During periods of heavy rainfall, there is a likelihood that sediments and heavy metals from the unsealed roads will be directed towards these sensitive environments.

- Recommend using Annual Average Daily Traffic (AADT) which provides a more balanced view of traffic or taking into account seasonal fluctuations of traffic volumes, for example we note Henderson Bay Road has an average daily traffic (ADT) of 96 vehicles per day (VPD), counted during September 2021 which is both off-peak season and likely affected by the alert level status during the Covid-19 Pandemic, as a previous count undertaken in December 2020 resulted in 280 VPD being recorded.

- We note that all counts completed between early 2020 to present day have likely been somewhat affected by the reduction in both international and domestic tourism and also potential change in commutes for local residents. We therefore recommend that the top 100 roads on the seal extension prioritisation list have more regular and ongoing (suggest twice yearly, on and off peak) traffic counts completed to validate their position within the matrix.

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1.0 INTRODUCTION

Hutchinson Consulting Engineers (Hutchinson) has been engaged by the Northland Transportation Alliance (NTA) to undertake an independent review of the Dust Matrix prioritisation tool and methodology used to prioritise unsealed roads located within the Far North District Council.

2.0 OBJECTIVE AND SCOPE

2.1 Objective

In accordance with the Northland Transportation Alliance brief, the objective of the review was to:

- A review of the purpose and function of the matrix including the snapshot in time philosophy
- A review of the functionality (i.e. formulae etc), to determine if the attributes, weightings and the formulae for ranking have accurately prioritised roads that best fit Council's desired outcomes.
- That the resulting attributes and scores are complete, accurate and transparent to elected members and the public.
- That the processes for updating and changing the attributes, attribute scores and the ranking formulae are clearly defined and followed.
- A review of issues with the matrix already identified by the NTA (traffic counts etc)
- Identification of any other issues
- A detailed review of six roads nominated by NTA as a sense check
- Commentary on fitness for purpose and any other methodology suggested for prioritising sealing that best fit Council's desired outcomes.

2.2 Scope

The scope of works performed to meet the above objective included:

- To review the current dust matrix prioritisation tool and methodology
- To review the attributes used as part of the prioritisation methodology and assess how the relevant information is captured
- To visit the 6 roads selected by NTA and complete site-specific observations of key attributes used in the prioritisation process
- To compare the existing prioritisation information with the attribute data captured as part of the site-specific road observations
- To report on findings including general recommendations.

2.3 Limitations

As a result of the review being undertaken over a relatively small sample of unsealed carriageways, the comparison between existing desktop prioritisation data and the results captured as part of site specific observations can only be inferred over the remaining network based on the sample.

3.0 REGION & NETWORK DESCRIPTION

The Far North District encompasses an area of over 7300km^2 and extends from Cape Reinga in the north around 175km south to the east-west district boundary between Whangarei and Kaikohe. As a result of its size, the topography of the Far North varies significantly throughout the district from low-lying coastal flats to gently rolling pasture in much of the north and south and steep farming and forestry land through the interior and pockets of the west coast.

Given the size and variable topography, climatic conditions across the region also differ considerably with NIWA rainfall and wind speed data ranging from around 1000mm to 2000mm per year and 2m/s to 7m/s respectively across the district.

The Far North District Council (FNDC) roading network comprises around 2530km of roadway and is divided into two individual maintenance contract areas shared by Broadspectrum NZ and Fulton Hogan. The ratio of sealed to unsealed roadway is approximately as follows,

- Unsealed Roadway 1666km (66%)
- Sealed Roadway 864km (34%)

As part of the seal extension matrix audit, the Northland Transport Alliance (NTA) selected six carriageways in the Far North District to be observed and validated against the seal extension matrix. The six sites are noted below.

1. Otaua Road, Kaikohe
2. Rawhiti Road, Kawakawa
3. Motuti Road, Panguru
4. Parapara Road (Hill Section), Taipa
5. Henderson Bay Road, Henderson Bay
6. Purerua Road, Kerikeri

The six sites selected by the NTA are a representative sample of the varied roading network through the Far North District with the nature of the carriageways varying to suit the environment. Otaua Road, Henderson Bay Road and Purerua Road typically comprising flat, open, well-shaped unsealed carriageways through flat to gently undulating farmland, while Motuti Road , Parapara Road and Rawhiti Road can be described as generally more steep, highly constrained carriageways.

While highly variable, the unsealed network generally comprises meandering carriageways cut through natural terrain over the path of least resistance, especially through the steeper interior and coasts.

The majority of unsealed carriageways throughout the district are typically local rural or rural secondary collector roads that service a mixture of lifestyle properties, farming, agriculture, forestry, quarrying and light-industrial activities and despite a significant proportion of the region being sparsely populated and relatively remote, the region also has at least 127 Maraes, 74 Schools, 63 Places of Worship, 230 Department of Conservation Reserves and Parks and numerous other community facilities, a significant number of which are also served by the unsealed unsealed network.

Figure 4.1 – Overall view of the Far North District

Unsealed carriageways throughout the FNDC typically have Average Daily Traffic (ADT) counts of no more than around 300 vehicles per day (VPD), with the average ADT across the network being around 93 VPD (based on FNDC RAMM 2019).

ADT	Number of Carriageways	Percentage of Total
0-50	495	71
51-100	145	21
101-200	45	6
201-300	4	0.6
301-400	3	0.5
401-500	2	0.4
500+	3	0.5
Total	697	100%

Figure 5.1 – Summary of FNDC Unsealed Network Traffic Volume (FNDC RAMM 2019)

4.0 CURRENT 2019 SEAL EXTENSION PRIORITISATION PROCESS

We understand that in 2019, Far North District Council and the Northland Transportation Alliance developed the dust matrix prioritisation tool to assist with the council decision making process of investments for seal extensions. Which is based on *Table 7.1* from the New Zealand Transport Agency (NZTA) Research Report 590 - *Impacts of exposure to dust from unsealed roads (April 2017)* and presented within the General Circular Investment memo: No 16/04.

Below is a summary of the current seal extension prioritisation risk assessment and associated scoring used to assess unsealed roads.

FNDC Scoring Matrix, developed from NZTA's GC 16/04 SITE DUST RISK FACTORS AND SCORES						
Risk factor/score	**0**	**1**	**2**	**3**	**4**	**5**
TRAFFIC						
HCV 5 day AADT	0	≥ 1 but < 6	≥ 6 but < 11	≥ 11 but < 26	≥ 26 < 50	≥ 50
HCV Speed	< 25	≥ 26 but < 30	≥ 30 but < 40	≥ 40 but < 50	≥ 50 but < 70	≥ 70
LDV 5 day AADT	< 20	≥ 21 but < 45	≥ 45 but < 85	≥ 85 but < 185	≥ 185 but < 350	≥ 350
Speed of LDVs (Est)	< 30	≥ 31 but < 38	≥ 38 but < 50	≥ 50 but < 68	≥ 68 but < 100	≥ 100
RECEPTORS						
Houses (factor per house within distance bracket)	0.025 (151 - 300m)	0.075 (101 - 150m)	0.100 (61 -100m)	0.150 (31 - 60m)	0.300 (21 - 30m)	0.350 (0 - 20m)
Schools	0					1
Maraes	0			1		2
Churches	0					1
Health Centers	0					1
Ecological Areas	0	1	2	3	4	≥5
Horicultural areas	0	1	2	3	4	≥5
Location of Roadway	open plains or coastal	some land features likely to slow winds	inland enclosed valley			
Frequency of rain days	More than 2 events per week	0- 1events per week	Less than one event every two weeks			
COST FACTORS						
Annual Mntence Cost Prev 3 year av./km	≤ $3,000	> $3,000 but ≤ $9,000	> $9,000 but ≤ $30,000	> $30,000 but ≤ $106,000	> $106,000 but ≤ $371,000	> $371,000 but ≤ $1,295,000
Estimated Sealing Cost	> $3,000,000	> $975,000 but ≤ $3,000,000	> $375,000 but ≤ $975,000	> $112,500 but ≤ $375,000	> $37,500 but ≤ $112,500	≤ $37,500
ECONOMIC GROWTH & TOURISM						
Tourism Route	No Tourism on this Road	On Tourism Road but no overlap with Tourism Route	Road Sections Overlaps with Tourism Route			
Network Resilience	No Resilience Road	On Resilience Road but no overlap with Resilience Route	Road Sections Overlaps with Resilience Route			
Disaster Resilience	No Resilience Road	On Resilience Road but no overlap with Resilience Route	Road Sections Overlaps with Resilience Route			
Logging Route	No		YES			
Longevity of HCV route (Years)	0	1-2	2-3	3-5	5-7	7-10
Longevity of logging route use	0	1-2	>3			
Milk sheds (Number)	0	1	2	3	4	5

Figure 5.1 – FNDC Seal Extension Scoring Matrix – Based on NZTAs GC 16/04

Although based on Table 7.1 and utilising the same scoring, the FNDC Prioritisation Matrix includes additional attributes to factor in maintenance costs and sealing costs, tourism, agriculture and network/disaster resilience.

Once attributes are input into the matrix and scoring is complete, a carriageway can be categorised according to Figure 5.2 below (Table 7.2 from NZTAs Research Report 590 - *Impacts of exposure to dust from unsealed roads April 2017)*

DUST RISK CATEGORY AND ACTION TO BE TAKEN			
Total dust risk score	**Dust risk category**	**Potential benefit from dust mitigation**	**Action to be taken**
0 to 9	Low	Little or no benefit from mitigation.	End of decision—making process.
10 to 19	Medium	There may some benefit from mitigation.	Return to and repeat the 'Site dust risk factors and scores' with refined site-specific information.
20 to 28	High	There is likely to be a benefit from mitigation	Complete assessment of suitable options.

Figure 5.2 – Risk Score, Category, Benefits & Actions (Based on Research Report 590 Table 7.2)

5.0 CURRENT 2019 SEAL EXTENSION PRIORITISATION ATTRIBUTES

There are 22 attributes associated with the current seal extension prioritisation process which affect the scoring of an individual carriageway and hence affect its prioritisation for sealing, these attributes are presented below.

- HCV 5 day AADT
- HCV Speed
- LDV 5 day AADT
- LDV Speed
- Houses
- Schools
- Maraes
- Churches
- Health Centers
- Ecological Areas
- Horicultural areas
- Location of Roadway
- Frequency of Rain Days
- Annual Maintenance Cost
- Estimated Sealing Cost
- Tourism Route
- Network Resilience
- Disaster Resilience
- Logging Route
- Longevity of HCV Route
- Longevity of Logging Route
- Milk Sheds

Of the 22 attributes, Traffic Volumes (AADT/HCV%) and Rain Days are the only attributes that can be accurately quantified without any concerns regarding the reliability of the data, as they're the only two attributes which are independently and physically recorded.

Maintenance Cost can also be reasonably relied upon, as it is regularly reviewed/updated by the local authority as part of RAMM records.

However, the remaining attributes are largely dependant on potentially subjective desktop study, based on aerial imagery, local directories, local authority and government data etc and manually entered into the prioritisation matrix.

As part of the audit process the 'FNDC Road Prioritisation to Guide the Delivery of Road Asset Upgrades (Rev14)' spreadsheet was analysed and reviewed in order to validate the quality of the data used in the prioritisation process.

The data for dwelling proximity was generally found to be accurate, with the number of dwellings verified on-site during the site observations generally in accordance with those values noted in the prioritisation matrix.

However, the data available for the remaining attributes is generally poor, with many 'receptors' not included within the scoring. The omission of numerous Marae, Churches and Tourism/Community Facilities results in misrepresentation of the carriageway priority.

6.0 PROPOSED SEAL EXTENSION PRIORITISATION TOOL

We understand that Far North District Council and the Northland Transportation Alliance are developing a new dust matrix prioritisation tool for seal extension prioritisation. The proposed new prioritisation tool is a more streamlined process and focuses on the highest weighted attributes associated with unsealed roads.

The scoring of each attribute is based on the Whangarei District Council Seal Extension Guidelines. The guidelines are divided into two stages being the physical characteristics and the regional and local priority adjustment. Below is a summary of the scoring process associated with the physical characteristics.

Traffic Movements (AADT)	*Score*	*Heavy Commercial Vehicles[1] (% HCV)*	*Score*	*Dwellings/km (<100m from road)*	*Score*
1 - 50	2	1 – 5	2	1 – 2	1
51 - 100	4	6 – 10	4	3 – 4	2
101 - 200	6	11 – 15	6	5 – 10	3
201 – 500	8	16 – 20	8	11 – 15	4
➢ 500	10	➢ 20	10	16 – 20	5
				➢ 20	6
Score:		*Score:*		*Score:*	
Accidents[2] (DSI)	*Score*	*Maintenance[3] (Activity/Km)*	*Score*	*Amenities[4]*	*Score*
1	1	Pot holes / grading <10ph / <1.5km	1	1 – 2	1
2 – 3	2		2	3 – 5	2
4 – 5	3	<26ph / <3.5km	3	6 – 10	3
6 – 10	4		4	>10	4
➢ 10	5	>27ph / >3.5km	5		
Score:		*Score:*		*Score:*	
Total Score[5]:					

Figure 6.1 – WDC Seal Extension Guidelines - Physical characteristic scoring

A summary of the second stage of assessment associated with the seal extension guidelines is presented on the following page..

Stage 2 - Regional and Local Priority Adjustment

The total score determined through stage 1 of the assessment is then adjusted for the regional and local value sealing the road:

1. High Priority Value – Total Score + 30%
    - Sealing an unsealed through route or diversion route
    - Improves access to regionally significant amenity
    - Improves access to identified growth areas
    - Promotes economic growth/tourism such as completion of a scenic route
    - Promotes significant improvements to water quality in sensitive catchments or marine environments
2. Medium Priority – Total Score + 15%
    - Improves access to a local significant amenity
    - Improves access to a local Community amenity reducing community isolation
    - School bus route
3. Low Priority Value – Total Score + 0%
    - All other unsealed roads
    - Roads that have significant physical or economic barriers to undertaking seal extension works

Figure 6.2 – WDC Seal Extension Guidelines – Stage 2 scoring

7.0 PROPOSED SEAL EXTENSION PRIORITISATION ATTRIBUTES

There are nine primary attributes which affect the scoring of an individual carriageway and hence affect its prioritisation for sealing and these are captured in the proposed seal extension prioritisation tool. The nine attributes are presented below.

- Traffic (AADT & HCV%)
- Crash Data
- Maintenance/Fault Data
- Dwelling Proximity
- Marae Presence
- Church Presence
- Tourism Operations/Community Facilities
- Horticulture/Agriculture Operations
- Ecological (DoC Reserves etc)

Of the nine attributes, Traffic Volumes (ADT/HCV%) is the only attribute that can be accurately quantified without any concerns regarding the reliability of the data, as it's the only attribute which is independently and physically recorded.

The Crash Data and Maintenance/Fault Data can also be reasonably relied upon, as it is regularly reviewed/updated by the local authority as part of RAMM records.

However, the remaining six attributes are largely dependant on desktop study, based on aerial imagery, local directories, local authority and government data etc and manually entered into the prioritisation matrix. In order to simplify the scoring, the presence of Maraes, Churches, Tourism Operations, Horticulture/Agriculture and DoC Reserves etc are all grouped into 'amenities'

As part of the audit process the 'FNDC Road Prioritisation to Guide the Delivery of Road Asset Upgrades (Rev14)' spreadsheet was analysed and reviewed in order to validate the quality of the data used in the prioritisation process.

The data for dwelling proximity was generally found to be accurate, with the number of dwellings verified on-site during the site observations generally in accordance with those values noted in the prioritisation matrix.

However the data available for the remaining attributes is generally poor, with many 'elements' not included within the scoring. The omission of numerous Marae, Places of Worship and Tourism/Community Facilities results in misrepresentation of the carriageway. We also consider that the inclusion of some elements is the result of outdated aerial imagery etc as it is not reflective of what is present on-site.

It is considered that the actual Dust Matrix Prioritisation Tool is generally fit for purpose and in line with the process followed by other local roading authorities for seal extension prioritisations, however its function is dependent on the quality of the data entered into it.

8.0 SITE SPECIFIC OBSERVATIONS

As part of our review process, we visited and observed 6 roads located throughout the wider Northland District to carry out a site-specific assessment of the physical characteristics associated with the prioritisation tool.

The 6 roads were chosen by NTA and are as follows,

1. Otaua Road, Kaikohe
2. Rawhiti Road, Kawakawa
3. Motuti Road, Panguru
4. Parapara Road (Hill Section), Taipa
5. Henderson Bay Road, Henderson Bay
6. Purerua Road, Kerikeri

The site specific assessments were carried out between 9th and 10th June 2022. As part of our site assessments, we completed a check on the following physical attributes,

- Number of dwellings
- Confirmation of any amenities i.e. maraes, schools, churches etc
- Current pavement condition
- Proximity to existing sealed roads
- Potential for seasonal traffic volume fluctuations
- Logging and/or forestry operations

A summary of our site specific assessments and the associated physical attributes that were identified during our site observations is presented on the following pages.

8.1 Otaua Road, Kaikohe

Otaua Road is an approximately 5.1km long unsealed rural secondary collector road servicing a number of rural lifestyle properties and farms, as well as providing access to several amenities. The full road length RP0-5114m, is predominantly unsealed with the exception of two short chipsealed sections at the following locations,

- RP0-447m (447m)
- RP4266-4368m (102m)

The most recent 2021 FNDC traffic count records indicate Otaua Road has an Average Daily Traffic (ADT) count of around 134 vehicles per day (VPD), with a Heavy Commercial Vehicle count of 20% although this was recorded on the sealed section between RP0-387m. The most recent traffic estimate from 2021 indicates around 204 VPD with 10% HCV on the unsealed section located between RP1200-4266m.

This office visited and observed Otaua Road on Friday 10th June 2022. The carriageway was observed to be in generally good condition with little defect identified. Below is a summary of our observations.

Length of unsealed	4565m
Number of dwellings	24
Amenities	Marae, milking shed, church
Logging Route	Yes
Current pavement condition	Good
Proximity to existing sealed roads	No adjacent sealed sections
Potential for traffic fluctuations	Low

Figure 8.1.1 – *General road condition*

Figure 8.1.2 – *Logging operation entrance*

8.2 Rawhiti Road (North), Kawakawa

Rawhiti Road (North) is an approximately 8km rural secondary collector road servicing a number of coastal lifestyle properties and beach houses. A majority of the road is currently sealed with two separate sections of unsealed carriageway located between RP0-1110m and RP3817-5182m.

The road provides vehicle access to a boat ramp in Kaimarama Bay and several other amenities including a Marae, several accommodation facilities and a water taxi. The entrance to the Whangamumu walking track is also located off Rawhiti Road which is a DOC maintained trail extending towards Cape Brett.

The most recent FNDC traffic count records from January 2021, indicate Rawhiti Road has an Average Daily Traffic (ADT) count of around 381 vehicles per day (VPD), with a Heavy Commercial Vehicle count of 10%.

We anticipate Rawhiti Road will experience high seasonal traffic fluctuations as a result of the site locality. The beaches and amenities located in the northern end of the road result in the area being a popular summer destination.

This office visited and performed an assessment of Rawhiti Road on Thursday 9th June 2022. The carriageway was observed to be in good condition with little defect identified.

Length of unsealed	2475m
Number of dwellings	8
Amenities	Marae, boat ramp, accommodation facilities, DOC walking tracks, water taxi
Logging Route	No
Current pavement condition	Good
Proximity to existing sealed roads	Directly adjacent to existing sealed sections
Potential for traffic fluctuations	High

Figure 8.2.1 – *General road condition*

Figure 8.2.2 –*Entrance to DOC walking track*

8.3 Motuti Road, Panguru

Motuti Road is an approximately 4.2km long unsealed low volume rural road predominately servicing farming activities and some rural lifestyle blocks. The road provides access to a Marae and a church. The northern half of the road comprises steep undulating topography which would result in the need for increased maintenance with stormwater scouring etc. The southern half of the road comprises low lying topography directly adjacent to the tidal estuary. We anticipate the potential for flooding and inundation is high in the southern portion of the road.

The most recent FNDC traffic count records from December 2020 indicate Motuti Road has an Average Daily Traffic (ADT) count of around 89 vehicles per day (VPD), with a Heavy Commercial Vehicle count of 15%. An older traffic count dating from July 2015 indicated 43 VPD and 18% HCV.

This office visited and performed an assessment of Motuti Road on Friday 10th June 2022. The carriageway was observed to be in generally good condition with little defect visible.

Length of unsealed	4236m
Number of dwellings	22
Amenities	Marae, church
Logging Route	Yes
Current pavement condition	Average
Proximity to existing sealed roads	No adjacent sealed sections
Potential for traffic fluctuations	Low

Figure 8.3.1 – *General road condition*

Figure 8.3.2 – *Logging operation signage*

8.4 Parapara Road, Taipa

Parapara Road is an approximately 3.3km rural secondary collector road predominately servicing large farming blocks and several rural lifestyle properties. The first 640m of Parapara Road extending from State Highway 10 is sealed and the remaining 2.7km between RP640-3314m is unsealed.

Traffic counts vary significantly depending on count location, however the most recent FNDC traffic count records indicate an Average Daily Traffic (ADT) count of around 183 vehicles per day (VPD) and around 5% HCV on the unsealed section located between RP3094-3279m. The sealed section located between RP0-640m has a recent traffic volume count of around 400 VPD and around 16% HCV.

This office visited and performed an assessment of Parapara Road on Thursday 9th June 2022. The carriageway was observed to be in generally poor condition with multiple potholes evident, particularly within the southern end of the road where the topography was relatively level.

Length of unsealed	2674m
Number of dwellings	10
Amenities	Marae
Logging Route	Potentially?
Current pavement condition	Poor
Proximity to existing sealed roads	Adjacent to State Highway 10.
Potential for traffic fluctuations	Low

Figure 8.4.1 – *Multiple potholes in southern end of road*

Figure 8.4.2 – *Transition to unsealed at RP640m*

8.5 Henderson Bay Road, Ngataki

Henderson Bay Road is an approximately 5.7km unsealed rural secondary collector road providing overland access to Henderson Bay Beach, a small number of lifestyle properties, the North Wind Backpacker Lodge and also a small number of adjacent farms.

The latest FNDC traffic estimate from September 2021 indicates Henderson Bay Road has an Average Daily Traffic (ADT) count of around 96 vehicles per day (VPD), with a Heavy Commercial Vehicle count of 7%. However the previous traffic count figure dating from December 2020 recorded around 280 VPD and 6% HCV. Based on the traffic count information available, it is evident that Henderson Bay Road experiences high seasonal traffic volume fluctuations.

This office visited and performed an assessment of Henderson Bay Road on Thursday 9th June 2022. The carriageway was observed to be in typically good condition, with no evidence of recent maintenance and only one isolated subgrade failure.

Length of unsealed	5555m
Number of dwellings	28
Amenities	Beach access, backpackers, accommodation
Logging Route	No
Current pavement condition	Good
Proximity to existing sealed roads	Adjacent to State Highway 1
Potential for traffic fluctuations	High

Figure 8.5.1 – *General road condition*

Figure 8.5.2 – *Existing accommodation facility*

8.6 Purerua Road, Purerua

Purerua Road is an approximately 15km long rural secondary collector road that provides access to several large farming blocks, rural lifestyle properties and multiple residential properties located within a gated community at Tapuaetahi Beach. The road becomes a rural access beyond RP10058m which is adjacent to the intersection with Taronui Road.

The road is predominantly sealed between RP0-9578m and is unsealed beyond RP9578m through to RP15440m. There are several amenities accessed via Purerua Road including the Marsden Cross Scenic Reserve, Tapuaetahi Beach, a shooting range, Rangihoua Heritage Park and several accommodation facilities.

The latest FNDC traffic count from January 2021 indicates Purerua Road has an Average Daily Traffic (ADT) count of around 522 vehicles per day (VPD), with a Heavy Commercial Vehicle count of 21%. We anticipate based on the amenities present, the traffic count figure may vary throughout the seasons with the highest readings being in the summer season as reflected by the January 2021 count data.

This office visited and performed an assessment of Purerua Road on Thursday 9th June 2022. The carriageway was observed to be in good condition, with little evidence of recent maintenance.

Length of unsealed	5862m
Number of dwellings	3 (within 300m) 73 (accessed via Purerua Rd)
Amenities	Beach access, scenic reserve, shooting range, heritage park, accommodation facilities
Logging Route	No
Current pavement condition	Good
Proximity to existing sealed roads	First 10km is sealed. Sealed side roads present.
Potential for traffic fluctuations	High

Figure 8.6.1 – *Wide, Smooth Carriageway Profile*

Figure 8.6.2 – *Appropriate Superelevation*

9.0 DATA COMPARISON

Based on a review of the current prioritisation assessment tool and the proposed dust matrix prioritisation tool, we consider the later to be a more simplified and user friendly version. Although the proposed new system is simpler to use, the key attributes used to assess unsealed roads are captured.

It is generally considered that the current Dust Matrix Prioritisation Tool is generally fit for purpose and in line with the process followed by other local roading authorities for seal extension prioritisations, however its function is dependent on the quality of the of the data entered.

We have been provided with a prioritisation scoring spreadsheet summarising each of the road sections associated with the six roads we have been selected for review. The spreadsheet provides the scoring data using the proposed new Seal Extension Tool with both physical characteristics and regional and local priority adjustment included.

We have carried out our own assessment using the spreadsheet provided with data captured during our site specific observations and data sourced from FNDC RAMM information. We were unable to source information on road maintenance and road accidents therefore these values were left unchanged.

Below is a comparison of the scoring results provided to us by FNDC and the results we produced using information sourced during our site observations and a desktop study.

Road Name	Section	Section Start	Section End	length (m)	Stage 1 Score	Final Score	Rank
PURERUA ROAD	RP9578-10058m	END OF SEAL	TARONUI ROAD	480	26	33.8	1
RAWHITI ROAD (NORTH)	RP3817-5182m	END OF SEAL	START OF SEAL	1365	19	24.7	2
OTAUA ROAD	RP0-1200m	PUNAKITERE LOOP ROAD (W)	GRAHAM ROAD	1200	18	23.4	3
OTAUA ROAD	RP1200-4266m	GRAHAM ROAD	START OF SEAL	3066	18	23.4	3
PARAPARA ROAD	RP2058-2981m	END OF SEAL	START OF SEAL	923	18	23.4	3
RAWHITI ROAD (NORTH)	RP0-1110m	MANAWAORA ROAD	START OF SEAL	1110	17	22.1	6
PARAPARA ROAD	RP640-1945m	END OF SEAL	START OF SEAL	1305	17	22.1	6
MOTUTI ROAD	RP0-4236m	WEST COAST ROAD	END (GATE)	4236	16	20.8	8
PURERUA ROAD	RP10414-13970m	CATTLE STOP	RANGIHOUA ROAD	3556	16	20.8	8
OTAUA ROAD	RP4368-5114m	END OF SEAL	RENWICK ROAD	746	17	19.6	10
PARAPARA ROAD	RP3094-3279m	END OF SEAL	START OF SEAL	185	14	18.2	11
HENDERSON BAY ROAD	RP134-2010m	END OF SEAL	START OF SEAL	1876	13	16.9	12
PURERUA ROAD	RP13970-15440m	RANGIHOUA ROAD	END (CATTLE STOP)	1470	11	14.3	13
PURERUA ROAD	RP10058-10414m	TARONUI ROAD	CATTLE STOP	356	10	13.0	14
HENDERSON BAY ROAD	RP3757-5689m	END OF SEAL	END	1932	12	12.0	15
HENDERSON BAY ROAD	RP2234-3455m	END OF SEAL	START OF SEAL	1221	9	11.7	16

Figure 9.1 – FNDC scoring

Road Name	Section	Section Start	Section End	length (m)	Stage 1 Score	Final Score	Rank
PURERUA ROAD	RP9578-10058m	END OF SEAL	TARONUI ROAD	480	27	35.1	1
RAWHITI ROAD (NORTH)	RP3817-5182m	END OF SEAL	START OF SEAL	1365	21	27.3	2
RAWHITI ROAD (NORTH)	RP0-1110m	MANAWAORA ROAD	START OF SEAL	1110	19	24.7	3
OTAUA ROAD	RP0-1200m	PUNAKITERE LOOP ROAD (W)	GRAHAM ROAD	1200	21	24.2	4
OTAUA ROAD	RP1200-4266m	GRAHAM ROAD	START OF SEAL	3066	20	23.0	5
PURERUA ROAD	RP10414-13970m	CATTLE STOP	RANGIHOUA ROAD	3556	17	22.1	6
PARAPARA ROAD	RP3094-3279m	END OF SEAL	START OF SEAL	185	16	20.8	7
HENDERSON BAY ROAD	RP134-2010m	END OF SEAL	START OF SEAL	1876	16	20.8	7
OTAUA ROAD	RP4368-5114m	END OF SEAL	RENWICK ROAD	746	18	20.7	9
MOTUTI ROAD	RP0-4236m	WEST COAST ROAD	END (GATE)	4236	18	20.7	9
PARAPARA ROAD	RP640-1945m	END OF SEAL	START OF SEAL	1305	15	19.5	11
PARAPARA ROAD	RP2058-2981m	END OF SEAL	START OF SEAL	923	15	19.5	11
HENDERSON BAY ROAD	RP3757-5689m	END OF SEAL	END	1932	15	19.5	11
HENDERSON BAY ROAD	RP2234-3455m	END OF SEAL	START OF SEAL	1221	14	18.2	14
PURERUA ROAD	RP13970-15440m	RANGIHOUA ROAD	END (CATTLE STOP)	1470	13	16.9	15
PURERUA ROAD	RP10058-10414m	TARONUI ROAD	CATTLE STOP	356	11	14.3	16

Figure 9.2 –HCE scoring

There are minor variations between the FNDC and HCE assessments in the Stage 1 scores and final scores indicated in Figure 9.1 and 9.2 on the previous page.

A full version of each spreadsheet is provided in Appendix A of this report which identifies where the differences are however below is brief summary of the main differences.

- Parapara Road used traffic count from the existing sealed section
- Henderson Bay Road, we have adopted an annual average AADT between the 2020 summer count and the 2021 winter count and applied this to all 3 sections.
- We have included any amenities that may not necessarily be located directly adjacent to the unsealed section but are accessed via the unsealed section.
- Some amenities were not accommodated in the scoring assessment.
- Minor revisions to the priority adjustment in Stage 2.

10.0 RECOMMENDATIONS

From our assessment of the current seal extension prioritisation process and site specific data comparison we have compiled a list of recommendations and suggestions for FNDC to consider going forward. These should be considered as part of the new tool being developed.

Below is a list of our recommendations,

- Each individual road section should be identified by the route position (RP) for clarity.

- Where there are significant traffic volume differences between a traffic count and a traffic estimate on the same road, priority should be made to ensure a traffic count is carried out on the estimated section to ensure an accurate ADT figure is assessed.

  Parerua Road was a good example where the first unsealed section between RP9578-10058m had a traffic count volume of 522 VPD and the next two sections beyond this relied on a traffic estimate of 104 VPD. We anticipate based on the number of amenities located at the end of this road that the traffic estimate may not be completely accurate.

- Logging and/or forestry operations should be included in the scoring assessment.

- Recommend assigning amenities to each road section that are accessed via the unsealed section of road. It appears that currently the amenity is only included if it is located directly adjacent to the road section.

  Rawhiti Road is a good example where there are several amenities located at the northern end of the road however the two sections of unsealed carriageway are assessed as having little to no amenities.

- Recommend introducing an environmental factor to the scoring assessment. Roads located in low lying topography and adjacent to significant streams, wetlands and/or marine environments should be reflected in the scoring. During periods of heavy rainfall, there is a very high chance that sediments and heavy metals from the unsealed roads will be directed towards these sensitive environments.

- Recommend using Annual Average Daily Traffic (AADT) which provides a more balanced view of traffic or taking into account seasonal fluctuations of traffic volumes, for example we note Henderson Bay Road has an average daily traffic (ADT) of 96 vehicles per day (VPD), counted during September 2021 which is both off-peak season and likely affected by the alert level status during the Covid-19 Pandemic, as a previous count undertaken in December 2020 resulted in 280 VPD being recorded.

- We note that all counts completed between early 2020 to present day have likely been somewhat affected by the reduction in both international and domestic tourism and also potential change in commutes for local residents. We therefore recommend that the top 100 roads on the seal extension prioritisation list have more regular and ongoing (suggest twice yearly, on and off peak) traffic counts completed to validate there position within the matrix.

11.0 LIMITATION

This report has been prepared solely for the benefit of Far North District Council as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without prior review and agreement in writing be at such parties sole risk.

Should you wish to discuss any aspects of the above information, please contact this office.

We trust this meets with your approval.

Yours faithfully,
IAN HUTCHINSON CONSULTANTS LTD

Prepared by	J. Charlwood **SENIOR ROADING ENGINEER**	Prepared by	N. Douglas **SENIOR ROADING ENGINEER**
Approved by	P. Farley **TEAM LEADER - CIVIL**	Reviewed by	I. Hutchinson **PRINCIPAL ENGINEER**

Appendix A – Summary of Prioritisation Scoring Comparison

HCE Prioritisation assessment summary

					AADT		HCV		Buildings (dwellings)			Accidents		Maintenance			Amenities									Stage 1 Score	Stage 2 Adjustment							Final Score	Rank
Road Name	Section	Section Start	Section End	length (m)	ADT	AADT Score	HCV	HCV Score	Buildings	Buildings per km	Buildings Score	Crash Count	Score	Fault Count	Km per month	Maintenance score	Community Halls	Marae	Places Of Worship	Significant Reserve	Dairy Shed	Commercial	School Bus	Horticulture	Amenities Score		Through Road	Growth Area	Tourism Site	Diversion	Scenic	NRC Priority Catchment	Stage 2 Priority Adjustment		
PURERUA ROAD	RP9578-10058m	END OF SEAL	TARONUI ROAD	480	522	10	21	10				1	1	8	5.82	5				1		1			1	27	1		1		1		1.3	35.1	1
RAWHITI ROAD (NORTH)	RP3817-5182m	END OF SEAL	START OF SEAL	1365	381	8	10	4	4	3	2			12	3.92	5		1		1		1	1		2	21		1	1		1		1.3	27.3	2
RAWHITI ROAD (NORTH)	RP0-1110m	MANAWAORA ROAD	START OF SEAL	1110	217	8	7	4	3	3	2			15	1.11	3		1		1		1	1		2	19		1	1		1		1.3	24.7	3
OTAUA ROAD	RP0-1200m	PUNAKITERE LOOP ROAD (V	GRAHAM ROAD	1200	134	6	20	8	4	3	2			23		3		1	1		1		1		2	21	1						1.15	24.2	4
OTAUA ROAD	RP1200-4266m	GRAHAM ROAD	START OF SEAL	3066	204	8	10	4	13	4	2	1	1	26	0.02	3		1	1		1		1		2	20	1						1.15	23.0	5
PURERUA ROAD	RP10414-13970	CATTLE STOP	RANGIHOUA ROAD	3556	104	6	10	4	1	0		1	1	19	11.81	5				1		1			1	17	1		1		1		1.3	22.1	6
PARAPARA ROAD	RP3094-3279m	END OF SEAL	START OF SEAL	185	183	6	5	2	6	32	6			6		1		1					1		1	16	1						1.3	20.8	7
HENDERSON BAY ROAD	RP134-2010m	END OF SEAL	START OF SEAL	1876	188	6	7	4	1	1	1	1	1	16		3							1	1	1	16			1		1		1.3	20.8	7
OTAUA ROAD	RP4368-5114m	END OF SEAL	RENWICK ROAD	746	153	6	10	4	4	5	3			14		3		1	1		1		1		2	18	1						1.15	20.7	9
MOTUTI ROAD	RP0-4236m	WEST COAST ROAD	END (GATE)	4236	89	4	15	6	22	5	3			26		3		1	1				1		2	18							1.15	20.7	9
PARAPARA ROAD	RP640-1945m	END OF SEAL	START OF SEAL	1305	183	6	5	2	2	2	1	1	1	11		3		1			1		1		2	15	1						1.3	19.5	11
PARAPARA ROAD	RP2058-2981m	END OF SEAL	START OF SEAL	923	183	6	5	2	3	3	2	1	1	22		3		1					1		1	15	1						1.3	19.5	11
HENDERSON BAY ROAD	RP3757-5689m	END OF SEAL	END	1932	188	6	7	4	17	9	3			1		1							1	1	1	15			1		1		1.3	19.5	11
HENDERSON BAY ROAD	RP2234-3455m	END OF SEAL	START OF SEAL	1221	188	6	7	4	4	3	2			1		1							1	1	1	14			1		1		1.3	18.2	14
PURERUA ROAD	RP13970-15440	RANGIHOUA ROAD	END (CATTLE STOP)	1470	104	6	10	4	2	1	1			5		1				1		1			1	13	1		1		1		1.3	16.9	15
PURERUA ROAD	RP10058-10414	TARONUI ROAD	CATTLE STOP	356	104	6	10	4												1		1			1	11	1		1		1		1.3	14.3	16

FNDC Prioritisation assessment summary

					AADT		HCV		Buildings (dwellings)			Accidents		Maintenance			Amenities									Stage 1 Score	Stage 2 Adjustment							Final Score	Rank
Road Name	Section	Section Start	Section End	length (m)	ADT	AADT Score	HCV	HCV Score	Buildings	Buildings per km	Buildings Score	Crash Count	Score	Fault Count	Km per month	Maintenance score	Community Halls	Marae	Places Of Worship	Significant Reserve	Dairy Shed	Commercial	School Bus	Horticulture	Amenities Score		Through Road	Growth Area	Tourism Site	Diversion	Scenic	NRC Priority Catchment	Stage 2 Priority Adjustment		
PURERUA ROAD	RP9578-10058m	END OF SEAL	TARONUI ROAD	480	522	10	21	10				1	1	8	5.82	5										26	1						1.3	33.8	1
RAWHITI ROAD (NORTH)	RP3817-5182m	END OF SEAL	START OF SEAL	1365	381	8	10	4	2	1	1			12	3.92	5							1		1	19	1				1		1.3	24.7	2
OTAUA ROAD	RP0-1200m	PUNAKITERE LOOP ROAD (V	GRAHAM ROAD	1200	134	6	20	8	2	2	1			23		3										18	1						1.3	23.4	3
OTAUA ROAD	RP1200-4266m	GRAHAM ROAD	START OF SEAL	3066	204	8	10	4	8	3	2	1	1	26	0.02	3										18	1						1.3	23.4	3
PARAPARA ROAD	RP2058-2981m	END OF SEAL	START OF SEAL	923	270	8	10	4	3	3	2	1	1	22		3										18	1					1	1.3	23.4	3
RAWHITI ROAD (NORTH)	RP0-1110m	MANAWAORA ROAD	START OF SEAL	1110	217	8	7	4	1	1	1			15	1.11	3							1		1	17	1						1.3	22.1	6
PARAPARA ROAD	RP640-1945m	END OF SEAL	START OF SEAL	1305	270	8	6	4	2	2	1	1	1	11		3										17	1					1	1.3	22.1	6
MOTUTI ROAD	RP0-4236m	WEST COAST ROAD	END (GATE)	4236	89	4	15	6	7	2	1			26		3		1	1				1		2	16			1				1.3	20.8	8
PURERUA ROAD	RP10414-13970	CATTLE STOP	RANGIHOUA ROAD	3556	104	6	10	4	1			1	1	19	11.81	5										16	1						1.3	20.8	8
OTAUA ROAD	RP4368-5114m	END OF SEAL	RENWICK ROAD	746	153	6	10	4	4	5	3			14		3							1		1	17							1.15	19.6	10
PARAPARA ROAD	RP3094-3279m	END OF SEAL	START OF SEAL	185	183	6	5	2	3	16	5			6		1										14	1					1	1.3	18.2	11
HENDERSON BAY ROAD	RP134-2010m	END OF SEAL	START OF SEAL	1876	177	6	4	2				1	1	16		3							1		1	13	1						1.3	16.9	12
PURERUA ROAD	RP13970-15440	RANGIHOUA ROAD	END (CATTLE STOP)	1470	104	6	10	4						5		1										11	1						1.3	14.3	13
PURERUA ROAD	RP10058-10414	TARONUI ROAD	CATTLE STOP	356	104	6	10	4																		10	1						1.3	13.0	14
HENDERSON BAY ROAD	RP3757-5689m	END OF SEAL	END	1932	96	4	7	4	10	5	3			1		1										12						1		12.0	15
HENDERSON BAY ROAD	RP2234-3455m	END OF SEAL	START OF SEAL	1221	167	6	4	2						1		1										9	1						1.3	11.7	16