WAKA KOTAHI
NZ TRANSPORT AGENCY

INVESTMENT AUDIT REPORT

Technical Audit of Far North District Council

Monitoring Investment Performance

Report of the investment audit carried out under Section 95(1)(e)(ii) of the Land Transport Management Act 2003.

DAWN SHANNON

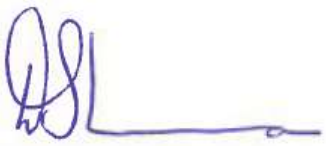
26 NOVEMBER 2020

FINAL

New Zealand Government

Approved Organisation (AO):	Far North District Council
Waka Kotahi NZ Transport Agency Investment (2018 – 2021 NLTP):	$ 66,015,400 (budgeted programme value)
Date of Investment Audit:	23-26 November 2020
Audit Team:	Dawn Shannon - Senior Investment Auditor (Lead) Mark Chamberlain – Team Leader Transportation, Selwyn DC Martin Taylor – Senior Investment Advisor
Report No:	RADST-2019

AUTHORITY SIGNATURES

Prepared by: 

Dawn Shannon, Senior Investment Auditor

Approved by: 

Yuliya Gultekin, Practice Manager Audit & Assurance — 9/03/2021 Date

EXECUTIVE SUMMARY

The Far North District's road network is well managed by an engaged and cohesive team and is largely in good condition. However, expenditure on maintenance and renewal is high when compared to peer councils. Structures, signage and delineation devices are the principal areas where improvement is warranted. Capital improvement and renewal works are completed to a good standard and effective, innovative treatments are being applied.

Council takes a strategic approach to the management of its maintenance and renewal activity and this has significantly contributed to an improved network in terms of both condition and operation. The impacts of the 2020 COVID-19 lockdowns were well managed and network integrity maintained. Contractors developed pandemic plans to ensure that essential works were safely undertaken, and additional cost has been minimal.

Significant improvements in data quality have been made but there is still room to strengthen systems to ensure reliable and accurate data for decision-making and to provide the evidence needed for investment by Waka Kotahi NZ Transport Agency (Waka Kotahi). Condition rating is a mandatory requirement of Waka Kotahi and must be reinstated.

The annual number of deaths and serious injuries, listed in New Zealand's Crash Analysis System as occurring in the Far North District, on the local road network, has increased steadily since 2011/12, ranging between 19 and 40 DSI's per year. Personal risk (crashes per VKT) is high when compared to similar councils. A large proportion of crashes occur on bends, on unsealed roads, at night and one in four involved motorcycles. The Council's safety improvement projects appear well designed and implemented to achieve the project's desired outcomes and Council was seen to be proactive in addressing safety issues generally.

AUDIT RATING ASSESSMENT

Subject Areas		Rating Assessment*
1	Previous Audit Issues	N/A
2	Network Condition and Management	Some Improvement Needed
3	Activity Management Planning	Effective
4	Data quality	Some Improvement Needed
5	Road Safety	Some Improvement Needed
Overall Rating		**Some Improvement Needed**

** Please see Introduction for Rating Assessment Classification Definitions*

RECOMMENDATIONS

The table below captures the audit recommendations. Agreed dates are provided for the implementation of recommendations by the approved organisation.

We recommend that Far North District Council:		Implementation Date
R1.1	Increases general inspection of bridges to a minimum two-yearly cycle.	Proposed from 2021/22
R2.1	Adopts the standard templates for economic evaluation found in the Waka Kotahi Monetised Benefits and Costs Manual and utilise locally demonstrated input costs and expected lives.	Compliant from 2020/21
R2.2	Ensures that preventive maintenance is undertaken at developing slump/ dropout sites in a timely manner.	Immediate (subject to funding)
R2.3	Ensures that sight rails, roadside signs, markers and other devices are maintained in a serviceable condition and to current standards.	Immediate (subject to funding)
R2.4	Rationalises road marking need throughout the District based on road classification and a consistent level of service.	Immediate (subject to funding)
R3.1	Reviews development standards (technical specifications and detailed drawings) to reduce the variety and ensure the quality of asset types to be maintained by Council.	2021/22 FNDC Engineering Standards document currently under review
R4.1	Ensures compliance with Waka Kotahi funding rules that require condition rating surveys to be undertaken.	n/a
R4.2	Considers reviewing the relevant processes to ensure that maintenance cost data added to the RAMM database is timely, accurate and complete.	Immediate
R5.1	Ensures ongoing full compliance with Waka Kotahi funding rules that require Road Safety Audits for renewal and improvement projects.	Compliant from 2020/21
R5.2	Develops and implements a programme to upgrade rural road delineation, with a strong focus on curve warning, to ensure a safe and consistent driving environment during both day and night.	Programme already underway 2020/21, Road to Zero Funding package, (subject to future funding)
R5.3	Ensures the appropriate and compliant safety devices, are consistently installed at the sites of slips and dropouts.	Immediate

1.0 INTRODUCTION

1.1. Audit Objective

The objective of this audit is to provide assurance that Waka Kotahi NZ Transport Agency's (hereafter Waka Kotahi) investment in Council's land transport programme is being well managed and delivering value for money. We also seek assurance that the Council is appropriately managing risk associated with Waka Kotahi investment. We recommend improvements where appropriate.

1.2. Assessment Ratings Definitions

	Effective	Some Improvement Needed	Significant Improvement Needed	Unsatisfactory
Investment management	Effective systems, processes and management practices used.	Acceptable systems, processes and management practices but opportunities for improvement.	Systems, processes and management practices require improvement.	Inadequate systems, processes and management practices.
Compliance	Waka Kotahi and legislative requirements met.	Some omissions with Waka Kotahi requirements. No known breaches of legislative requirements.	Significant breaches of Waka Kotahi and/or legislative requirements.	Multiple and/or serious breaches of Waka Kotahi or legislative requirements.
Findings/ deficiencies	Opportunities for improvement may be identified for consideration.	Error and omission issues identified which need to be addressed.	Issues and/or breaches must be addressed, or on-going Waka Kotahi funding may be at risk.	Systemic and/or serious issues must be urgently addressed, or on-going Waka Kotahi funding will be at risk.

1.3. Council Comments

Prior to this report being approved, Far North District Council was invited to comment on the auditors' findings, recommendations and suggestions. Where appropriate this report has been amended to reflect this dialogue. Any additional auditee response comments are attached in the Appendices.

2.0 ASSESSMENT FINDINGS

Our findings relating to each subject area are presented in the tables below. Where necessary, we have included recommendations and/or suggestions.

1. Previous Audit Issues	
The March 2008 technical review of the Far North District made recommendations related to pavement data, drainage management and bridge maintenance. A follow up review was carried out in March 2013 to assess progress and found that those items continued to require attention by Council. The 2013 report made one recommendation and that was for Council to improve its management of, and focus on, all its structural assets. The current audit findings confirm that Council has made progress in analysing its bridge stock and is developing a programme of upgrade and replacement works. General bridge inspections are undertaken on a three yearly basis and any deficiencies identified are prioritised and scheduled in the relevant maintenance or renewal programmes. Best practice for bridge inspections is that they be carried out every two years with principal inspections every six years. A risk managed approach can be taken to inspection regimes, but the two-yearly inspection should be regarded as a minimum requirement. Council has also developed a *Retaining Wall Management Plan* to manage these assets based on route criticality, including guidance on inspection regimes, asset data collection, condition assessment and works programming. Funding profiles have been developed to facilitate reactive and planned maintenance. It is noted that the Hokianga Ferry service is funded under structures related work categories. This distorts expenditure trends and we suggest that Council work with Waka Kotahi to identify a separable budget category for the maintenance and operation of the Ferry service.	
Recommendations	**We recommend that Council:** R1.1 Increases general inspection of bridges to a minimum two-yearly cycle.
Suggestions	**We suggest that Council:** S1.1 Considers undertaking retaining wall inspections in conjunction with the general inspection cycle for bridges.
Far North District Council's comment	**R1.1 Bridge Inspections: accepted** - from 2021/22 Council is proposing to increase the general inspection of bridges to a minimum two-yearly cycle, with critical bridges and coastal structures subject to the marine environment, to be inspected on an annual basis. Funding for this has been included in the 2021-24 AMP funding request. **S1.1 Retaining Walls: accepted** - from 2021/22 Council is proposing to undertake retaining wall inspections in conjunction with the general inspection cycle for bridges. **Hokianga Ferry Services** - This issue was discussed during the development of the 2021-31 AMP. The NTA proposed to move the ferry operation costs into WC123 Operational Traffic Management. However, NZTA recommended that the current use of WC114 Structures Maintenance for the ferry operations should not be changed because it was based on a previous decision by NZTA (2010 internal memo B1110996) on how to fund the ferry operations.

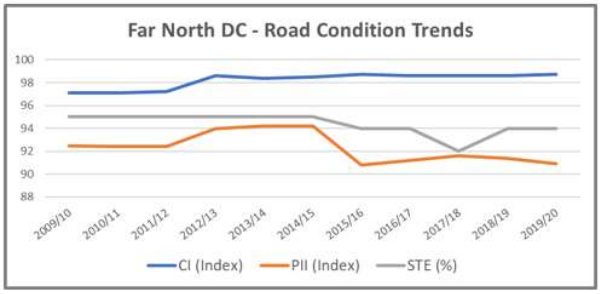
* * *

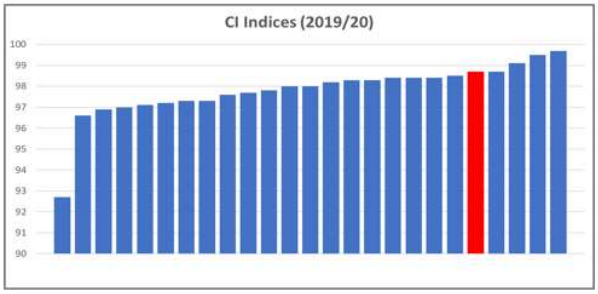
2. Network Condition and Management	Some Improvement Needed

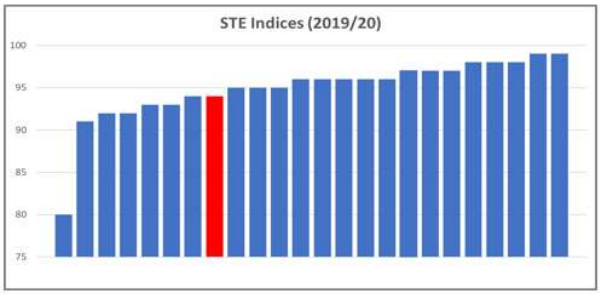
The Far North District's road network is well managed and largely in good condition. Unsealed roads provide a good ride and Council is strategically working towards improving pavement design and dust suppression. Some attention is warranted on delineation in order to have appropriate signs and roadmarking for the road category and consistency across the network. Similarly, a consistent approach to alerting road users to dropouts is needed. This will improve on the current mixture of edge marker posts and timber sight rails in varying condition and type.

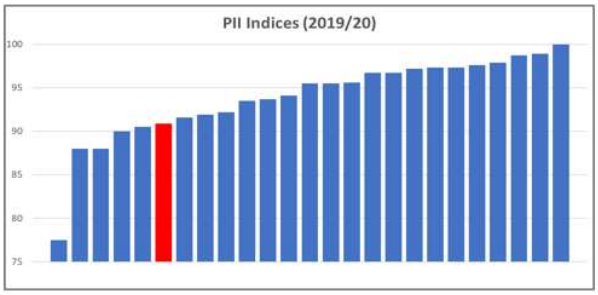
Performance Monitoring

Road condition indices for 2019/20 are compared with peer group councils (rural districts) in the graphs below, along with the Far North District trends over the last decade. The trend data shows a slight deterioration in Pavement Integrity Index (PII) and Smooth Travel Exposure (STE) and no recent change in Condition Index (CI). It is pertinent to note that, as Council does not carry out Condition Rating (discussed below), the CI data has not updated since January 2014 and the PII includes some similarly outdated inputs. When compared to peer councils, both the PII and STE rank poorly.

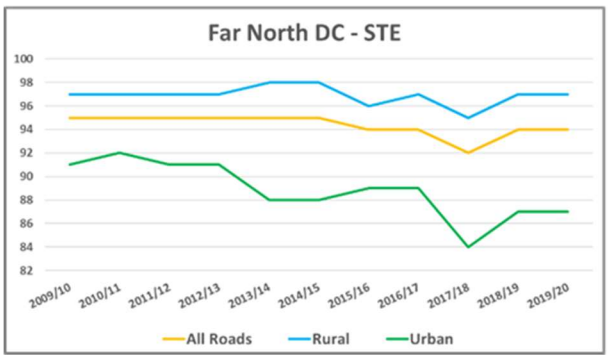


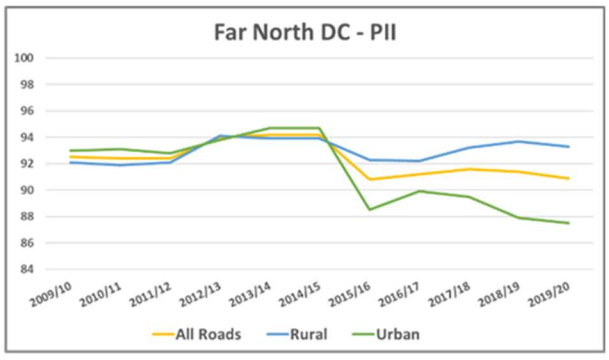




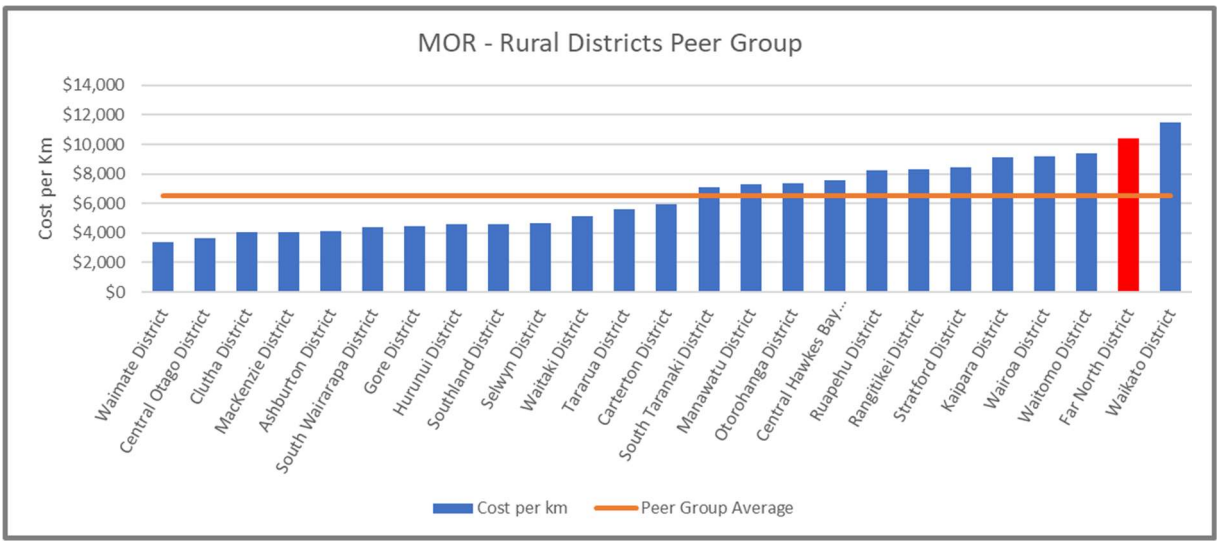


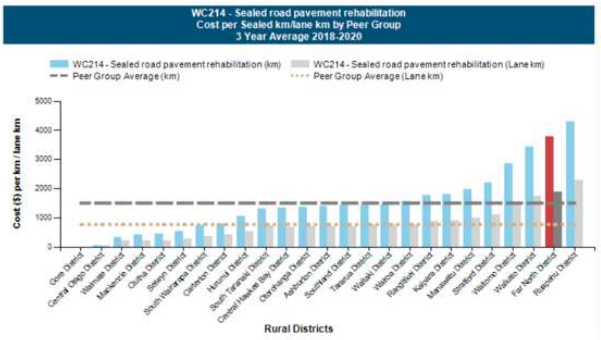
Further analysis of STE (graph below on left) reveals that the urban network is considerably rougher than the rural network and is deteriorating. A similar analysis of PII (below right) indicates a divergent trend where urban pavement condition is deteriorating at a faster rate than rural. These are concerning trends that Council needs to investigate, understand and address.





The cost per km for maintenance, operations and renewals (excluding emergency works) as a three-year average (2018-2020) is $10,418/km, which is significantly over the peer group average of $6,505/km. Resurfacing and pavement rehabilitation costs contribute to this high rate of expenditure. See graphs below for comparisons with peer councils. We were unable to ascertain the reason for this high cost differential during the audit and recommend that Council investigate further.





Compliance

Council does not fully comply with the Planning & Investment Knowledge Base requirements. Specifically, we noted that:

- Bridge and structural inspections are generally undertaken in accordance with the Waka Kotahi S6 *Bridges and other significant highway structures inspection policy*. See comments in Section 1 *Previous Audit Issues.*
- Roughness recorded in RAMM complies with the requirements set in the Waka Kotahi Knowledge Base.
- Condition Rating is non-complying – see section 4 *Data Quality*.
- Net present value (NPV) analysis is undertaken for improvement and rehabilitation projects, but an outdated form is used (based on the examples we viewed). The standard forms for economic evaluation can be found in the Waka Kotahi *Monetised Benefits and Costs Manual*[1]. Additionally, the use of actual data from the Far North's RAMM database for inputs such as maintenance costs and achievable seal life would produce more robust outcomes.

[1] Refer to https://www.nzta.govt.nz/resources/monetised-benefits-and-costs-manual/

General Observations

The standard of completed works was observed to be very good. The carriageway resurfacing and pavement rehabilitation projects that were inspected featured good quality cross sectional shape and surfacing finishes and comprehensive attention to ancillary works such as shoulder flanking, reforming of drainage channels and upgrading of delineation/signage. Capital improvement and emergency works were similarly completed to a good standard.

Based on the sample travelled during our inspection, unsealed roads (1630 km; 65% of network length) have good ride quality with only a few obvious defects, such as potholes and corrugations. The adoption of the Paige-Green Index to help formulate wearing courses is clearly contributing to this outcome. The cross-sectional shape is well formed, generally within the preferred range of 4-8% on straights and with well-graded superelevation on bends. The steeper superelevations on tighter bends comfortably accommodated our car, but Council does need to ensure that logging and other large trucks with high centres of gravity are not at risk of sliding or overturning. For this reason, superelevation should not exceed 8-10%, dependent on the number of loaded heavy vehicles, speed and curve radii. Guidance is available in Table 3.10 of the ARRB *Best Practice Guide for Unsealed Roads* (Edition 2, published October 2020) [2].

To address public complaints regarding dust on unsealed roads, Council have conducted numerous trials of proprietary dust suppressants. Our observations of recently treated sites were that they did significantly reduce dust. Further, there was an indication that repeated treatments over the years may contribute to more tightly bound pavements and subsequently smoother rides. Staff expressed an interest in this possibility, and we encourage further investigation. Conversely, success of the dust suppression trials appears to be resulting in increased demand for treatment. Given the ongoing cost of dust suppression and the extensive unsealed network, we caution Council to remain mindful of limited budgets and the need to spend wisely across all the needs of the Far North network and its users.

The topography and geology of much of the District makes the rural road network susceptible to damage, such as subsidence, slips and dropouts. Staff advised that recent investigations for the *Resilience Management Plan* identified some 1,150 slip sites over the 1,000 km of "critical routes" examined across Northland (an average of over one slip per kilometre on these routes). Compliant and appropriate warning devices should be consistently used – see Section 5 *Road Safety*. These devices, mostly timber sight rails, were of varying design and many were damaged and/or required painting. Additionally, the engineering response (such as crack sealing, stormwater bunds, etc) at developing events, should be implemented as soon as possible in order to extend the life of the asset. The photo to the right illustrates a developing dropout, which in this case is likely related to the slumping ground causing the culvert pipe to move and start leaking, thereby accelerating the failure. Annual culvert inspections and cleaning may help reduce dropouts as well as reducing flooding, scour and washouts due to blockages.

Other deficiencies observed on the sample of roads visited can be addressed by increased attention to routine maintenance. Examples of these deficiencies are:

- Footpath maintenance
- Sunken and uneven manhole and service lids/covers in traffic lanes
- Weed growth
- Blocked/obstructed culverts and stormwater channels
- Driveways spilling loose aggregate into traffic lanes
- Debris on bridge decks.

Signs and Delineation Devices





The photos above illustrate examples we observed of deficiencies in the management and maintenance of traffic signs in the District. These concerns include (from left to right) twisted signs, graffitied signs, faded and illegible signs, outdated signs and signs that may no longer be serving a purpose. That last item was discussed on the field trip on several occasions, particularly where WU1 PEDESTRIANS or WU2 CHILDREN permanent warning signs were requested and installed many years ago. It is not cost effective to maintain and renew signs that relate to changed or outdated circumstances. However, we do commend Council for working with residents to address local concerns. The photo to the right illustrates the successful outcome from recent liaison with local iwi to address speed concerns outside a marae on Otangaroa Road. The bespoke permanent warning sign, including the "slow down" message in te reo, has reportedly greatly increased compliance. Nonetheless, non-standard signs are discouraged, and we encourage Council to work with Waka Kotahi when developing new and innovative signs/devices. In particular, when trialling any innovations/ treatments which are not approved by Waka Kotahi, we recommend that Council formalises the trial and fully documents the outcome, so the benefits can be recognised and shared.

Night inspections are not routinely undertaken. It is suggested that a regime of regular inspections be implemented and that they utilise a driver unfamiliar with the network (provide "fresh eyes"). It is best practice to ensure all roads are inspected at least annually at night to ensure the adequacy of existing delineation (including curves), hazard warning and regulatory signs.

Roadmarking

[2] Refer to https://www.arrb.com.au/bestpracticeguides

Roadmarking throughout the District appeared generally good. However, there were instances of faded marking on high risk sites such as rural intersections. An example is the Runaruna Rd intersection with Pawarenga Rd as shown in the photo above left. Staff explained that roadmarking is closely managed to achieve cost effectiveness. However, our observations are that there are areas where roadmarking can be safely reduced. For example, we noted a level of service anomaly on some access and low volume roads. Significant lengths of the roads were unsealed with appropriately minimal delineation, but then an adjoining sealed section of road comprises centreline, continuous edge line (on both sides), EMP's and RRPM's. It is not value for money to provide a level of service that is inconsistent with the classification of the road (refer to Section 5 *Road Safety*) and with the adjacent lengths. At the least, and subject to a safety assessment based on seal width and traffic volumes, the full length of edge lines and RRPM's on lower trafficked roads should not be renewed going forward. Rural roadmarking budgets are better focused on maintaining intersection marking and, where justified, centrelines.	
Recommendations	**We recommend that Council:** R2.1 Adopts the standard templates for economic evaluation found in the Waka Kotahi *Monetised Benefits and Costs Manual* and utilise locally demonstrated input costs and expected lives. R2.2 Ensures that preventive maintenance is undertaken at developing slump/ dropout sites in a timely manner. R2.3 Ensures that sight rails, roadside signs, markers and other devices are maintained in a serviceable condition and to current standards. R2.4 Rationalises road marking need throughout the District based on road classification and a consistent level of service.
Suggestions	**We suggest that Council:** S2.1 Investigates and reports to Waka Kotahi on the reasons for their comparatively high maintenance and renewal expenditures. S2.2 Considers commencing regular night inspections.
Far North District Council's comment	**R2.1 accepted** - compliant from 2020/21. **R2.2 accepted** - Immediate, subject to future funding. **R2.3 accepted** - Immediate, subject to future funding. **R2.4 accepted** - Immediate, subject to future funding. Roadmarking rates in all of the 5 Northland maintenance contracts have more than doubled in the last contract round (2017). All Councils have had to rationalise the remarking requirements to match available budgets but accept the comments regarding providing consistent LOS to road hierarchies. **S2.1 Maintenance & Renewals Expenditure** - this matter was discussed in the Audit, and also with NZTA as part of the development of the 2021-31 AMP which is quite clear that some of the key reasons for FNDC higher costs are: Lack of access to good quality materials; long material cartage distances from the few quarries; poor subgrade conditions resulting in earlier failures and thicker pavement; lack of contractor competition especially for specialist work such as bridging and streetlights; and the operation of the Hokianga Ferry service also adds a significant cost to the MO&R categories. Half of the comparative councils in the FNDC Peer Group are South Island councils which have comparatively good subgrades and ready access to quality pavement materials. **S2.2 Night Inspections** - This will be considered from 2021/22.

* * *

3. Activity Management Planning	Effective

General

Council has an active and complete 2018-28 Activity Management Plan (AMP) that incorporates the programme business case for maintenance operations and renewals and Low Cost, Low Risk programmes of work. The key strategic problems are a reactive approach to maintenance/renewal, impacts of freight and forestry, network capacity constraints, facilitating tourist traffic, weather events impacting network resilience, structures in poor condition and a high personal safety risk.

Activity Management

Transportation in Far North District is managed by the Northland Transportation Alliance (NTA) which is a collaboration between the Whangarei, Kaipara and Far North District Councils, Northland Regional Council and Waka Kotahi. It has been operating since 1 July 2016. Feedback from staff portrays a positive and supportive working team environment. However, consultants are utilised to provide some core specialist professional services and the audit team is concerned that the loss of these individuals would be a major setback to the effectiveness of NTA. Council is aware of this risk and is working on succession planning to ensure that transfer of skills does take place. We support this essential transition and recommend that the development of staff, including the continuation of the current cadetship programme, be a Council priority.

Council`s staff advised that network integrity was maintained during the COVID-19 lockdown periods. Contractors developed and provided appropriate pandemic plans, ensuring that essential works were safely undertaken. These plans will be retained as standard operating practice in the event of any further outbreaks of COVID-19 or future pandemics. There has been to date only minor cost implications for the network maintenance in the two maintenance contracts. One contractor has made no claims. The other has made very minor claims, relating to extra costs on maintenance and for additional work required on some renewal projects due to the extended shutdown. These did not include any costs covered by the Government's wage subsidy scheme.

Strategies and Plans

We commend Council for taking a strategic approach to management activity. A suite of plans / strategies has been identified for development. Key strategies (and current status) include:

- Traffic Counting Strategy Review – a five-year programme of counts (264 counts/year in Far North District) has been developed based on catchments (9 in Far North District)
- Retaining Wall Management Plan – has provided annual funding profiles for maintenance, component renewal and replacement of retaining walls based on route criticality
- Drainage Management Plan – has provided annual, risk-based funding profiles for water table maintenance/ renewal, kerb and channel renewal, culvert renewal, culvert flushing and subsoil allowance
- Resilience Management Plan – currently being developed
- Forestry Loading Review and Impact Assessment – currently being developed
- Unsealed Road Strategy – currently being developed (including formation of Centre of Excellence).

Development Standards

The field inspections included new subdivisions and other developments, where we noted that many features don't align with current best practice (e.g. mountable kerb) or with sustainable maintenance/renewal practice (e.g. decorative lamp posts, AC used on access / low volume streets). Other concerns included carriageway and verge widths, culvert headwalls, swales and rain gardens, street tree placement and speed treatments. The team was concerned that a lack of control of these design aspects will lead to a marked increase in compliance costs to meet and maintain standards (e.g. ongoing maintenance from poor drainage feature design; cost of adding or upgrading pedestrian facilities for accessibility).

It is recommended that Council review their subdivision development standards and update as required, including strengthening linkages to the District Plan and NZS 4404. The inclusion of a comprehensive review, or standalone review, of asset design specifications and detailed drawings will facilitate cost effective maintenance/renewal and ensure best whole of life costs by standardising the asset specifications.

Bridge Posting

Some 24 bridges in the Far North District do not have the load carrying capacity to carry Class 1 loading (vehicles meeting the normal requirements of the Heavy Motor Vehicle Regulations) and therefore require posting to restrict heavy vehicles. Posting by public notice, issued under regulation 11 of the Heavy Motor Vehicle Regulations 1974, is most applicable to temporary restriction situations where the intention is to carry out strengthening works to reinstate the bridge to full loading capacity. Where the restriction is likely to be permanent (or semi-permanent), it is worth considering the alternative process of regulating the weight of vehicles using the bridge through a bylaw made under section 22AB(1)(zh) of the Land Transport Act 1998, pursuant to the process set out in the Local Government Act 2002. While this approach saves the costs of annually obtaining an engineer's certificate for each bridge and the publication of the posting notification, it is strongly recommended that a risk-based programme of inspections is maintained for these structures. The bylaw approach also allows the accumulation of the District's parking and traffic restrictions into one repository, making for easy reference by road users.

The photo below shows a fully laden HPMV (up to 62T) traversing a Class 1 weight restricted bridge (maximum 44T) on West Coast Road. This route is assumed to be regularly used by logging trucks and highlights the need for closer liaison with the companies involved.

Recommendations	**We recommend that Council:** R3.1 Reviews development standards (technical specifications and detailed drawings) to reduce the variety and ensure the quality of asset types to be maintained by Council.
Suggestions	**We suggest that Council:** S3.1 Prioritise the development of staff, including the continuation of the current cadetship programme, to ensure continuity of level of service and resource. S3.2 Considers the long-term restriction of heavy vehicles on vulnerable bridges by means of a Bylaw process.
Far North District Council's comment	**R3.1 accepted** - The FNDC are currently reviewing the Engineering Standards document for development throughout the District. Council is working with the other Councils in Northland to develop a single EES document for the region. The NTA is responsible for the management of roading and traffic safety issues relating to new developments for the FNDC and will be able to apply appropriate and consistent standards across the Region. **S3.1 accepted** - The establishment of the NTA allows the four participating Councils to pool existing resources, attract better qualified staff and make provision for training and succession planning across the Region. The benefits from the amalgamation are already evident for the organisation. **S3.2 accepted** - Improvements have been made to the Bridge Management Professional Services contract and provision has been made in the 2021-31 AMP for increases in the programme to bring bridge inspections back to a 2-yearly inspection cycle. Council is aware that they have a significant problem with vulnerable bridges and a large number of logging trucks on the network.

* * *

4. Data Quality	Some Improvement Needed

Road Efficiency Group's (REG) 2019/20 data quality report has scored Council with a very good 83/100 (a score of 100 is achieved by having all metric results at the expected standard level). The improvement from the 2018/19 score of 69 demonstrates that Council has put considerable effort into data management and quality.

However, the ONRC PMRT indicates (as at August 2020) there are high importance areas for improvement (i.e. have major data issues) and they relate to:

- Road condition rating
- As-built data for pavement renewal and for AC and chipseal resurfacing

It is important that Council investigates, identifies and resolves these data gaps. Doing so will improve reporting at an individual level and allow Council to accurately compare its ONRC performance with its peers.

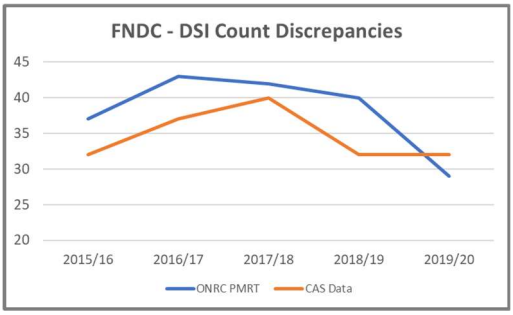
Condition Rating

Council has not been undertaking condition rating surveys since January 2014. Condition rating is a mandatory requirement by Waka Kotahi in order to receive funding assistance. The Waka Kotahi Knowledge Base[3] states "Roughness and condition rating surveys of all sealed roads must be undertaken at least every second year. Condition rating surveys of all sealed roads carrying more than 2000 vehicles per day are to be undertaken annually." And "As a condition of receiving funding assistance for road maintenance, Waka Kotahi requires the use of a road asset management system for treatment selection, which will include the following inventory data: …." and follows with a list which includes "condition rating". Further, "…the raters acting on behalf of the Approved Organisation are required to hold a current certificate…".

The data gleaned nationally from condition rating assists Waka Kotahi in comparing the condition of one council's network with another or with peer groups. It also provides an independent annual condition trend indicator for each network. The key indicators used are STE, PII and SCI.

Common condition rating practice is to rate the network based on a 10% sample which is generally 50 metres every 500 metres. While acceptable, this methodology does not correlate well with the actual condition of the network. Research (ref NZ Transport Agency Research Report 528)[4] shows that a high correlation exists between a full network survey and a network sample survey when the sample frequency is every 200 metres and the sample size is 40 metres (a 20% sample).

General



In New Zealand, the primary tool for capturing and managing crash data is the Crash Analysis System (CAS). From CAS, the data can be downloaded and used in RAMM, ONRC PMRT and other road safety systems. The Far North District DSI numbers presented in the PMRT, and used for performance comparisons nationally, do not reflect the CAS figures. While other parties may have a role in the transferral of data, it remains the responsibility of Council to ensure that any data and information published on behalf of, or representing the FAR North District, is correct. See the graph above.

A review of RAMM Manager reports indicates that Maintenance Cost data batches have historically only been loaded three or four times a year, but practice has improved since April 2020 with the batches being loaded monthly. Best practice[5] is to acquire the data, review for accuracy and completeness and upload into RAMM on a monthly cycle. Further, queries run on Council's RAMM database involving maintenance costs highlighted anomalies in the data. Of the nearly 225,000 entries, 46,787 relate to expenditures of $0. 51 entries are for negative amounts, totalling -$634,555.60. From 2015/16, extraordinarily high costs have been recorded for a range of activities. For example, routine grading costs $30/m (10 km is $300,000). A single entry for foundation maintenance at a Powells Road bridge in 2017/18 shows the expenditure was $157,662,680. A replacement culvert (pictured to the right) in Salvation Road reportedly cost $80,476,500. The full maintenance expenditure for 2017/18 shows as $476,634,433. Activities such as core maintenance relating to environment, surfacing, traffic facilities, etc, should be reasonably consistent from year to year, but the data showed large gaps in expenditure on these activities and an occasional unexplainable peak. It is likely that unrealistic unit rates and erroneous coding of works may be the source of some of these results and it is suggested that Council works closely with its contractors to ensure a consistent understanding and approach to the

recording of maintenance cost data. Robust maintenance costs facilitate invaluable analysis of network expenditure trends by year, by kilometre, by classification and by road - the measure of the actions taken to maintain the network inventory. They also provide a network-specific maintenance cost history that can be used in NPV calculations to justify renewal activity. Council is also reminded that closer scrutiny will be given to data accuracy in future TIO annual achievement reporting and to the delivery of the forecast quantities within the approved budget.	
Recommendations	**We recommend that Council:** R4.1 Ensures compliance with Waka Kotahi funding rules that require condition rating surveys to be undertaken. R4.2 Considers reviewing the relevant processes to ensure that maintenance cost data added to the RAMM database is timely, accurate and complete.
Suggestions	**We suggest that Council:** S4.1 Resolves the data issues identified in the REG Data Quality report to improve data accuracy, completeness and timeliness. S4.2 Considers reviewing the relevant quality processes ensuring accuracy of data provided to external parties and of the subsequently published data.
Far North District Council's comment	**R4.1 Condition Rating** - The NTA has not completed Condition Rating for a number of years due to its proven inaccuracies, safety concerns and the emergence of better repetitive collection technologies. The NTA ran both condition rating and HSD Cracking collection in parallel for two years to determine the effectiveness of HSD crack data. It was found that manual rating failed to capture the extent of cracking and potholes on the network, which was poorly informing decision-making tools such as the long-term pavement performance model. We understood and took lead from the NZTA, State Highways, in stopping condition rating on the same grounds as they did. However, the NTA has introduced, tested and has implemented new technology to provide this data and is currently in the last steps to fully implement the population of this data into the standard rating tables in RAMM. Since Council has been collecting the HSD Crack data, we have been analysing the data and using this in our decision-making process. This will allow NTA to more fully report SCI and PII on the network. SCI is the only measure heavily impacted by this technology implementation. PII uses the data sets already captured by the NTA through HSD survey (in the form of HSD rutting roughness and texture-flushing, 100% network coverage).

[3] Refer to https://www.nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/activity-classes-and-work-categories/road-maintenance/wc-151-network-and-asset-management-201821-nltp/
[4] Refer to https://www.nzta.govt.nz/assets/resources/research/reports/528/docs/528.pdf
[5] Refer to https://www.nzta.govt.nz/assets/Road-Efficiency-Group/docs/practice-overviews/REG-practice-overview-maintenance-activity-data.pdf

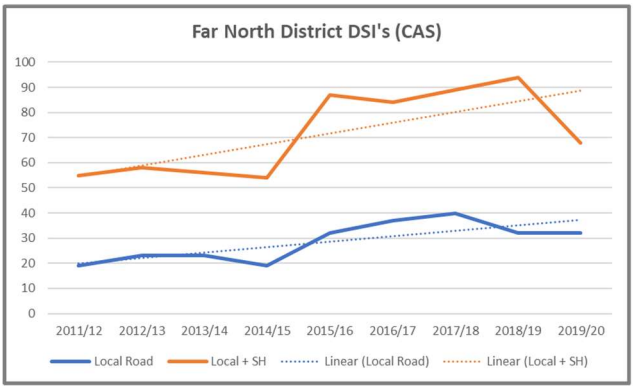
	As commented above, we have taken lead from NZTA H&O in discontinuing condition rating as blunt tool for the system we run today. Unlike the NZTA H&O condition rating has been replaced with more effective repetitive data collection through HSD Crack and Pothole data collection as part of comprehensive HSD data collection strategy (roughness, rutting, texture, geometry, cracking, potholes, video survey completed as one exercise) which covers 100% of the sealed network to better inform tools such as long term pavement performance models. RR 528 refer section 4.6; visual rating remains a subjective process with variable outcomes regardless of sample size as clearly demonstrated by the report. **R4.2** **accepted** - This was discussed during the Audit and initial findings into these costs have found a keying error in the way LS items such as grading have been given default values. This will be reviewed and corrected. As for the other anomalies at specific sites these will be looked at and corrected or reviewed where possible. **S4.1** **accepted** - Council will continue its improvement programme to address the data issues identified in the REG Data Quality report to improve data accuracy, completeness and timeliness. **S4.2** **accepted** – Immediate implementation
Auditor's Response	Regarding recommendation R4.1, we accept that technology is opening up possibilities for safer and more efficient means of carriageway condition assessment. However, at this time, a replacement methodology has not been agreed and the traditional condition rating remains a **mandatory** requirement in the Waka Kotahi funding rules. One of the key benefits of condition rating to Waka Kotahi is as a comparative tool. For example, the results aid in identifying networks requiring assistance to provide the same level of service as peer group or neighbouring networks and can be used as evidence for consequent funding applications. The majority of councils in New Zealand are currently compliant with this requirement. It should be noted that, in addition to rating the condition of pavement and surfacing, condition rating surveys also rate the condition of shoulders and surface water channels. With resilience and security included as a GPS 2021 outcome, there will be a need for greater emphasis on the condition of drainage assets obtained through manual condition rating.

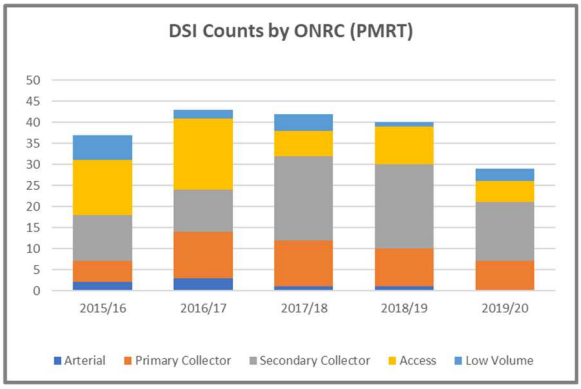
* * *

5. Road Safety	Some Improvement Needed

Performance Monitoring

The annual number of deaths and serious injuries (DSI's), listed in New Zealand's Crash Analysis System (CAS) as occurring in the Far North District on the local road network, has increased steadily since 2011/12, ranging between 19 and 40 DSI's. Numbers on the state highway network are increasing at a slightly faster rate. CAS data is illustrated on the graph below on the left. The graph on the right is taken from the ONRC PMRT and shows crash distribution by road category. Crashes on access and low volume roads appear to be trending down but secondary collector roads have spiked in recent years.





The levels of collective risk (crashes per km) on arterial roads (both urban and rural) and on rural primary collector roads are comparatively higher than the average of peer councils. Personal risk (crashes per VKT) is also higher on rural primary collector roads as well as rural secondary collector roads. On the urban network, access and low volume roads rank high for personal risk. The *Communities at Risk Register* 2019 indicates high concern for personal risk with regard to seven characteristics of the 15 measured, including speed, pedestrians involved and rural road loss of control &/or head-on.

Over the last five years (2015/16 – 2019/20), CAS records show 148 crashes which resulted in 173 DSI's. Of these, 58% were on a bend (loss of control/head on), 30% were on unsealed roads, 35% were at night and 25% involved motorcycles. Investigation is required to identify common factors in crashes and develop potential engineering solutions. Note that solutions can reduce the likelihood of a crash occurring or they can reduce/mitigate the consequences, if the crash is a result of non-roading factors.

Road Safety Audits

Council has not historically been fully compliant with Waka Kotahi requirements to undertake road safety audits at key stages of the "development of any improvement or renewal activity that involves vehicular traffic, and/or walking and/or cycling, proposed for funding assistance from the NLTP"[6]. However, over the last 12 months, the NTA road safety team has developed and is implementing processes to embed good safety audit practices in the organisation. The team's work is commended, and we do recommend that they maintain a regulatory role in signing off the audit process for all relevant projects.

General Observations

Given the popularity of the Far North District as a tourist destination frequented by overseas visitors (when travel is permitted), we commend Council for the frequent use of directional lane arrows to remind drivers to drive on the left.

[6] Refer to https://www.nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/activity-classes-and-work-categories/road-improvements-other-road-related-funding-policies-guidance/road-safety-audit/

Nearly half (49%) of the DSI crashes over the past 5 years (CAS data) occurred on bends on 100 kph open roads. The audit team observed that both road delineation (edge marker posts, centrelines, edge lines) and curve warning signage on the rural network is inconsistently applied and often non-complying with standard guidance for implementation. It is important that road safety is a high priority for Council and their maintenance suppliers. Ensuring consistent application and maintenance of road and curve delineation, based on road classifications, is an essential step in reducing the risk of death and serious injury crashes. This includes ensuring that appropriate speed advisory values are implemented and that all out of context curves are appropriately signed. Rehabilitation projects may be an opportunity to improve the geometric design of curves if this can be undertaken at acceptable costs. Guidance on the use and placement of delineation devices can be found in Part 5 (draft) of the TCD manual[7]. Noting too that 35% of all DSI crashes occurred at night, we strongly recommend a regime of regular night inspections to ensure that the delineation is compliant, safe and effective (refer to Section 2 *Network Condition and Management*).

The high incidence of slips and dropouts on the rural network provides a significant hazard to road users. We observed these in various stages of development. Most were signposted and secured, many were not. Where warning signage/devices were installed, there was inconsistent use of guardrails, complying sight rails, non-complying sight rails, broken and unpainted sight rails, lines of edge marker posts, random cones and other variants. Where a dropout occurs on the outside of a curve, a safety barrier should be considered. Further, compliant and appropriate warning devices should be consistently used. On some sites, slumps and dropouts extended into the traffic lane, but the resultant hazard to drivers was left unmarked awaiting scheduled remedial work or a higher intervention level. Wherever work cannot be undertaken immediately, temporary warning of any potential hazard should be provided to the travelling public.

During the field inspections, we observed the presence of loose chip and detritus on the sealed road surfaces at intersections, reducing traction and erasing roadmarking. In several instances, where the side road was unsealed, loose gravel from this road had migrated into the intersection. A preferred method to improve safety, road condition and reduce maintenance costs is to chip seal the side road approach. The optimal seal back distance is calculated based on the safe stopping distance for a heavy vehicle approaching the intersection. Sealing back provides safety benefits as well as facilitating the installation of full intersection makings, reducing dust and eliminating corrugations formed by acceleration and braking forces. Increased sealing back should also be considered on single lane bridge approaches (refer to Section 2 *Network Condition and Management*) and on rural driveways and farm entrances to minimise gravel migration and edge break at these locations.

Other concerns noted by the team included:

- Prevalence of uncontrolled intersections
- Prevalence of semi-permanent temporary speed limit signs that are not supported by an approved traffic management plan
- Inconsistent use of hazard markers on rural roadside obstacles.

[7] Refer to https://www.nzta.govt.nz/assets/consultation/draft-traffic-control-devices-manual/docs/TCD-manual-part-5-draft-June-2018.pdf

Recommendations	**We recommend that Council:** R5.1 Ensures ongoing full compliance with Waka Kotahi funding rules that require Road Safety Audits for renewal and improvement projects. R5.2 Develops and implements a programme to upgrade rural road delineation, with a strong focus on curve warning, to ensure a safe and consistent driving environment during both day and night. R5.3 Ensures the appropriate and compliant safety devices, are consistently installed at the sites of slips and dropouts.
Suggestions	**We suggest that Council:** S5.1 Considers sealing back unsealed road approaches to rural intersections.
Far North District Council's comment	**R5.1 accepted** - Council will be compliant from 2020/21. **R5.2 accepted** - Council already has a programme underway 2020/21, utilising Road to Zero funding. Future works are subject to funding. **R5.3 accepted** - Immediate implementation. **S5.1 accepted** - This will be considered but is subject to future funding.

* * *

3.0 APPENDICES

APPENDIX A

Network Field Inspections

Audit routes:

APPENDIX B

Sample of Audit Photos

Highlights from the audit included (clockwise from top left) the Hokianga Ferry; cycle paths (eg Horeke Rd); dust suppression on unsealed roads; waterfall on Fern Flat Rd, the team, customer satisfying signs, managing LOS (eg Diggers Valley Rd) and the good standard of the unsealed network (eg Sandhills Rd).

Some of the challenges are (clockwise from top left) forestry traffic; channel clearing (eg Pawarenga Rd), coastal/low use roads (eg Te Karaka Rd), bridge approaches (eg Orakau Rd), inadequate drainage (eg Matawaia-Maromaku Rd) and unsealed intersection approaches (eg Horeke Rd / SH 12).

A key challenge to the network is resilience – slumps and dropouts are prevalent. An associated concern is the inconsistent and damaged safety/warning devices used to keep road users safe.