



# Proposed District Plan submission form

Clause 6 of Schedule 1, Resource Management Act 1991

Feel free to add more pages to your submission to provide a fuller response.

Form 5: Submission on Proposed Far North District Plan

**TO: Far North District Council**

This is a submission on the Proposed District Plan for the Far North District.

## 1. Submitter details:

Full Name:	John Francis Papesch		
Company / Organisation Name: (if applicable)	Haigh Workman Limited		
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	Kerikeri 0245		
Phone contact: 09 4078327	Mobile: 0274 119944	Home:	Work:
Email (please print):	JohnP@haighworkman.co.nz		

2. (Please select one of the two options below)

- I **could not** gain an advantage in trade competition through this submission
- I ~~could~~ gain an advantage in trade competition through this submission

*If you could gain an advantage in trade competition through this submission, please complete point 3 below*

3.  I ~~am~~ directly affected by an effect of the subject matter of the submission that:  
\_\_\_\_ (A) Adversely affects the environment; and  
\_\_\_\_ (B) Does not relate to trade competition or the effect of trade competition

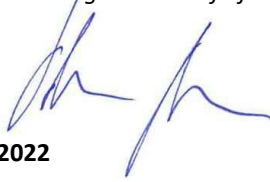
\_\_\_\_  I ~~am not~~ directly affected by an effect of the subject matter of the submission that:  
\_\_\_\_ (A) Adversely affects the environment; and  
\_\_\_\_ (B) Does not relate to trade competition or the effect of trade competition

*Note: if you are a person who could gain advantage in trade competition through the submission, your right to make a submission may be limited by clause 6(4) of Part 1 of Schedule 1 of the Resource Management Act 1991*

**The specific provisions of the Plan that my submission relates to are:**  
*(please provide details including the reference number of the specific provision you are submitting on)*

**Refer attached Submission**



Confirm your position: <input type="checkbox"/> Support <input type="checkbox"/> Support In-part <input type="checkbox"/> Oppose <b>Refer attached Submissions</b> <i>(please tick relevant box)</i>
<b>My submission is:</b> <i>(Include details and reasons for your position)</i>  <b>Refer attached Submission</b>
<b>I seek the following decision from the Council:</b> <i>(Give precise details. If seeking amendments, how would you like to see the provision amended?)</i>  <b>Refer attached Submission</b>
<input checked="" type="checkbox"/> I <b>wish</b> to be heard in support of my submission <input type="checkbox"/> I <b>do not wish</b> to be heard in support of my submission <i>(Please tick relevant box)</i>
If others make a similar submission, I will consider presenting a joint case with them at a hearing <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Do you wish to present your submission via Microsoft Teams? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Signature of submitter:</b> <i>(or person authorised to sign on behalf of submitter)</i>   <b>Date: 20 October 2022</b>  <i>(A signature is not required if you are making your submission by electronic means)</i>

**Important information:**

1. The Council must receive this submission before the closing date and time for submissions (5pm 21 October 2022)
2. Please note that submissions, including your name and contact details are treated as public documents and will be made available on council's website. Your submission will only be used for the purpose of the District Plan Review.
3. Submitters who indicate they wish to speak at the hearing will be emailed a copy of the planning officers report (please ensure you include an email address on this submission form).



**Send your submission to:**

**Post to:** Proposed District Plan  
Strategic Planning and Policy, Far North District Council  
Far North District Council,  
Private Bag 752  
KAIKOHE 0400

**Email to:** [pdp@fndc.govt.nz](mailto:pdp@fndc.govt.nz)

**Or you can also deliver this submission form to any Far North District Council service centre or library, from 8am – 5pm Monday to Friday.**

**Submissions close 5pm, 21 October 2022**

**Please refer to [pdp.fndc.govt.nz](http://pdp.fndc.govt.nz) for further information and updates.**

***Please note that original documents will not be returned. Please retain copies for your file.***

**Note to person making submission**

Please note that your submission (or part of your submission) may be struck out if the authority is satisfied that at least one of the following applies to the submission (or part of the submission):

- It is frivolous or vexatious
- It discloses no reasonable or relevant case
- It would be an abuse of the hearing process to allow the submission (or the part) to be taken further
- It contains offensive language
- It is supported only by material that purports to be independent expert evidence but has been prepared by a person who is not independent or who does not have sufficient specialised knowledge or skill to give expert advice on the matter.

**SUBMISSION NUMBER**

## **Submission on Proposed Far North District Plan**

Thank you for the opportunity to submit on the Proposed Far North District Plan. Our submission relates to civil engineering matters in which we have expertise.

Many of the engineering provisions of the Operative District Plan have been carried over to the Proposed District Plan. In general, they are working well and we have no comment to make on these provisions.

The Permitted Activity standards in the Proposed District Plan and Council's Engineering Standards will generally be suitable means of achieving the District Plan objectives. However, other engineering solutions may be more appropriate methods of achieving the objectives. It is therefore important to define the objectives clearly in the District Plan and encourage appropriate alternative engineering solutions when considering resource consent applications.

Where possible, duplication of consent processes should be avoided. For example, the District Plan objectives for vehicle crossings could be achieved through the vehicle crossing bylaw / permit system. Objectives for building durability and safety could be achieved through the Building Act / consent process.

There do not appear to be assessment criteria for Discretionary and Non-complying activities in the Proposed District Plan as there are in the Operative Plan. These are important in understanding what adverse effects need to be avoided, remedied or mitigated.

There is a heading in the Contents page for 'Contaminated Land', but we have not been able to find any related text either in the on-line version of the plan or the complete pdf version. As we have expertise in this area, we would appreciate the opportunity to make a submission on this topic if and when it is included in the Proposed District Plan.

## **Far North District Council Engineering Standards April 2022**

Many rules in the Proposed District Plan require compliance with Far North District Council Engineering Standards April 2022. Haigh Workman provided written comments on the draft Engineering Standards in May 2021 and March 2022. In general, the issues of concern raised in our comments have not been addressed in the April 2022 Engineering Standards.

We consider that there are parts of the Proposed District Plan and Engineering Standards April 2022 that are inappropriate for the Far North and/or are inconsistent with recognised engineering standards and sound engineering practice.

Where these issues appear in the Proposed District Plan, we have made a submission on that part of the Plan. The decision we seek from Council on the Proposed District Plan may require amendments to the relevant parts of the Engineering Standards.

The FNDC process also needs to allow for ongoing review and amendment of the Engineering Standards as practitioners become familiar with the document through use and identify problems. We would welcome the opportunity to be part of this process.



















**Decision Sought:** Amend the definition of 'Earthworks' to be the same as the definition in the Regional Plan for Northland.

#### **EW-R1 to EW-R11 Earthworks Rules**

Permitted activity rules EW-R1 to EW-R11 allow earthworks for a number of specified activities; earthworks for any other activity (such as re-contouring a paddock prior to planting an orchard, excavating stormwater detention basins, constructing earth bunds as noise barriers or simply disposing of fill excavated as a result of a permitted activity) automatically becomes a Restricted Discretionary activity.

The rules would be simpler and more effects based if they were condensed into one rule that allowed earthworks for any purpose subject to the standards EW-S1 to EW-S12.

**Decision Sought:** Delete Rules EW-R1 to EW-R11 and replace with one rule that permits earthworks for any purpose subject to the standards EW-S1 to EW-S12.

#### **EW-R13 / EW-S5 Erosion and Sediment Control**

We support the requirement for erosion and sediment control to be implemented on all earthworks in accordance with Auckland Council GD05. Note these are guidelines only and may not provide the precision and certainty required for a permitted activity rule. However, the guidelines are comprehensive and should be implemented.

Rule EW-R13 / EW-S5 is in addition to other earthworks rules in the Plan. As such, the matters of discretion where the standard is not met should be confined to erosion and sediment control issues.

**Decision Sought:** Retain Rule R13 / EW-S5, but amend matters of discretion to erosion and sediment control issues only.

#### **EW-S7 Land Stability**

Standard EW-S7 is open to wide interpretation. The risk of instability of land at or beyond the property boundary is addressed by standard EW-S6. Standard EW-S7 is redundant and should be removed.

The standard may have been intended to address the more general risk of earthworks being carried out on land subject to instability. To address this issue, the Earthworks rules could include a note similar to that in New Plymouth District Plan Standard EW-S1 but refer to '*Land Susceptible to Instability*' as defined in the Proposed Far North District Plan.

**Decision Sought:** Delete Standard EW-S7.

Add a note to the Rules:

*Earthworks on land defined as 'Land Susceptible to Instability' in the Definitions may result in instability. If there is reason to suspect that the earthworks may result in instability, a site-specific geotechnical assessment, undertaken in accordance with engineering best-practice, may be required to demonstrate compliance with this standard.*

## Stormwater Management

### Management Approach

We have identified inconsistencies in the rules and standards for stormwater management:

- between different zones in the District Plan;
- between land use and subdivision; and
- between the Proposed District Plan rules and Council's Engineering Standards (April 2022)

This is largely because there are no specific objectives and policies in the Proposed District Plan relating to stormwater management. The Natural Hazards section has general objectives and policies relating to avoiding increasing flood risks, but there are no specific objectives on what needs to be achieved and policies on how it will be achieved. Some of these objectives are set out in Engineering Standards section 4.1.2, but the District Plan Objectives and Policies may need to include more than engineering issues.

Stormwater management is proposed to be addressed in the District Plan through rules on Impermeable Surfaces in each zone as in the Operative District Plan. These rules also address landscaping / amenity issues, availability of land for wastewater disposal and natural hazard mitigation.

The Proposed District Plan allows development up to the permitted activity levels without mitigation of adverse effects. The Matters of Discretion in the zone and subdivision rules provide no guidance on how stormwater is to be controlled when the standard is breached – is it intended for stormwater control to achieve the standards in the draft Engineering Standards (refer attached comments on Engineering Standards), attenuate stormwater to permitted activity levels (as in the Operative District Plan) or to pre-development levels, or simply to ensure there are no adverse effects off site (and if so, what adverse effects need to be addressed)?

A consistent approach should be adopted for both land use and subdivision. For development that exceeds the impermeable surfaces thresholds and subdivision, we recommend that the District plan includes policies and rules similar to Regional Plan Rule C.6.4.2 (that is '*the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability*').

**Decision Sought:** Add a new chapter to the General District-Wide Matters addressing Stormwater Management (or Impermeable Surfaces generally) including overview, objectives, policies and rules in a similar way to the section on **Earthworks** management.

### Definitions: Impermeable Surfaces

The essential element of the definition of impermeable surfaces is in the heading: impermeable means creating 'a barrier to water penetration in to the ground'. The definition of Impermeable Surfaces should exclude properly designed and constructed permeable paving. We suggest a third exclusion to the definition:

*(iii) permeable surfacing that does not create a barrier to water entering the ground.*

Note: there is an error in copying the definition of impermeable surface from the Operative District Plan to the Proposed District Plan: Exclusion (i) should read '*water storage tanks occupying up to a maximum cumulative area of 20m<sup>2</sup>*'

**Decisions Sought:** Amend exclusion (i) to '*water storage tanks occupying up to a maximum cumulative area of 20m<sup>2</sup>*'

Add exclusion (iii) '*permeable surfacing that does not create a barrier to water entering the ground*'.

**Definitions: Low Impact Design Principles**

The term ‘low impact design’ is used in the matters of discretion in the zone and subdivision policies and rules , but there is no definition of what this term means. We recommend that the term be defined in the Definitions section.

The term ‘Low Impact Design’ is derived from Auckland Council TP124 : ‘*Low Impact Design*’ is a design approach for site development that protects and incorporates natural site features into erosion and sediment control and stormwater management plans. If this definition is used, reference should be made to TP124.

TP124 has been replaced by GD04 ‘Water Sensitive Design (WSD) for Stormwater’. The introduction to GD04 notes: ‘*WSD approaches focus on reducing or eliminating stormwater runoff generation through source control, and utilising natural systems and processes to manage stormwater quantity and quality effects.*’

If reference is made to GD04, the term ‘Low Impact Design’ should be replaced with ‘Water Sensitive Design’ throughout the District Plan.

**S215.053 Decision Sought:** Add a definition for the term ‘Low Impact Design’.

**RPROZ-R2 and HZ-R2: Permitted Impermeable Surfaces in Rural Production and Horticulture Zones**

The impermeable surfaces permitted activity thresholds proposed in the Proposed District Plan can be summarised as follows:

Zone	Rule	Impermeable Surfaces Permitted Activity
Rural Production	RPROZ-R2	15% (no area limit)
Horticulture	HZ-R2	15% (no area limit)
Rural Lifestyle	RLZ-R2	12.5% or 2500m <sup>2</sup> which ever is the lesser.
Rural Residential	RRZ-R2	12.5% or 2500m <sup>2</sup> which ever is the lesser.
Rural Settlement	RSZ-R2	35% or 600m <sup>2</sup> which ever is the lesser
General Residential	GRZ-R2	50% (35% in Russell)
Mixed Use	MUZ-R1 / MUZ-S10	90%
Light Industrial	LIZ-R1/ LIZ-S8	90%
Heavy Industrial	(no rule)	100%

The impermeable surfaces permitted activity thresholds of 15% for Rural Production and Horticulture zones are excessive and would result in significant adverse effects if development were to occur at these levels. A site developed with 15% impermeable surfaces will typically have 20% to 30% higher peak stormwater runoff compared with an undeveloped site, and will result in increased flooding and erosion downstream. As these zones comprise most of the District, cumulative adverse effects are also likely to be significant.

Northland Regional Council flood hazard maps have been developed on the basis of impermeable coverage as permitted under District Plan rules for urban areas, whilst existing impermeable coverage has been adopted for rural areas. Development to the permitted activity coverage in rural areas has not been anticipated in the flood hazard mapping.

The 15% permitted activity threshold for Rural Production and Horticulture zones is inconsistent with the objectives and policies of the zonings, for example Rural Production Objective RPROZ-O3 and Policies RPROZ-P2 and P5.

We recommend that the maximum impermeable surfaces permitted activity thresholds in the Rural Production and Horticulture zones be reduced to 5% (500m<sup>2</sup> per hectare). This would permit normal rural buildings, yards, races and roads while minimising cumulative adverse effects.

**S215.054 Decision Sought:** Reduce the impermeable surfaces permitted activity thresholds in the Rural Production and  
**S215.055** Horticulture zones from 15% to 5% of the site area.

## Far North District Council Engineering Standards April 2022

ES Reference	Haigh Workman Submission
<b>Chapter 3</b>	<b>Transportation</b>
3.1.5.4	The most recent Austroads standards should be referenced; for example Part 4 and Part 4A should be the 2017 version.
3.2.6.2	<p>Table 3-2 Urban and Table 3-3 Rural road standards are excessive and inconsistent with Low Impact Design principles. Very few existing Council roads in the Far North District comply with the proposed standards or would be upgraded to comply with the standards. Existing Urban Collector and Arterial roads have insufficient legal width to be upgraded to comply with the standards. NZS4404:2010 standards are more appropriate for Far North roads.</p> <p>Footpaths should be 1.5m wide (not 1.8m wide) and on one side only on urban roads serving up to 20 dwelling units. With rules in the District Plan requiring off-street parking, on-street parking is not required on both sides of an urban road and should be discouraged on Collector and Arterial roads.</p>
3.2.7 Design for Unsealed Roads	Over half of FNDC roads are unsealed. The Engineering Standards should include appropriate standards for unsealed roads, in particular for minimum sight distances at intersections and vehicle entrances. (refer also our comments below for maximum gradients on private accessways)
3.2.7.5	This section should include a minimum development length of superelevation based on a rotation rate of 3.5%/sec for less than 80km/h roads and 2.5%/sec for greater or equal to 80km/h roads (refer Austroads Part 3 Section 7.7.7)
3.2.27 / Sheet 4	<p>Refer our comments on District Plan TRAN-Table 8.</p> <p>Minimum sight distances have increased considerably compared with the current engineering standards, especially on higher speed and arterial / regional roads. Sight distances for the latter are proposed to be based on Safe Intersection Sight Distance which is often not attainable on Northland roads.</p> <p>Sight distances in District Plan Table 8 and ES Drawing sheet 4 appear to be based on the Austroads 'comfortable deceleration' rate of 0.26g. Austroads Guide to Road Design Part 3: Geometric Design 2016 (Austroads) indicates 0.26 may not be practicable and a deceleration rate of 0.36 is the appropriate value for calculating minimum stopping distances. Austroads Part 4A Intersection Guide Table 3.1 (appended) is based on a deceleration rate of 0.36 on sealed roads and this should be used to determine the minimum sight distance for all vehicle crossings. In combination with higher deceleration rates, a minimum reaction time of 2.0 sec should be used on all roads. Higher reaction + observation times may be appropriate on collector, arterial and regional roads.</p> <p>In many cases, the longer sight distances on collector, arterial and regional roads will not be achievable. In these cases, road safety may be achieved by road widening at the vehicle crossing as proposed in ES clause 3.2.27.4.</p>



The table should include columns for unsealed roads: over half the District’s local roads are unsealed. Stopping distances on unsealed roads are considerably greater than for sealed roads. Austroads Guide to Road Design Part 3 recommends a deceleration rate of 0.27 for unsealed roads (compared with 0.36 for sealed roads). A comparison of recommended minimum sight distances for sealed and unsealed access and low volume roads is appended.

The sight distances on Drawing sheet 4 are proposed to be based on the speed limit, while good roading design practice utilises 85%ile operating speeds. This is the approach taken by the Austroads standards and the current FNDC engineering standards. Design for the 85%ile operating speed caters for the majority of drivers. For design purposes, the 15% of drivers who exceed this speed are considered to be aware of the increased safety risk and are expected to maintain a higher level of alertness, effectively reducing their reaction times<sup>2</sup>. On most FNDC roads, 85%ile operating speeds are different to the speed limit; usually less because of geometric constraints, but sometimes greater. With speed limits now being set at 60km/h on some FNDC rural roads, operating speeds are likely to be higher than the speed limit on these sections of road. The table should be based on 85%ile operating speeds as in the current standards.

We recommend that sight distances be based on 85%ile operating speeds , a deceleration rate of 0.36 for sealed roads and 0.27 for unsealed roads,  $R_T = 2.0$  sec for Access and Collector roads, and  $R_0+R_T = 5.0$  sec for Arterial and Regional roads.

On that basis, minimum sight distances for level roads are:

85%ile Speed (km/h)	Unsealed roads	Sealed Access and Collector roads	Arterial and Regional roads.
40	46	40	73
50	64	55	97
60	86	73	123
70	110	92	151
80	138	114	181
90	168	139	214
100	201	165	248

Minimum sight distances should be adjusted for the longitudinal gradient of the road as detailed in Austroads standards. We recommend that the Engineering Standards include the safe stopping distance formula:

$$D = \frac{R_T \cdot V}{3.6} + \frac{V^2}{254 (d + e)}$$

A table of sight distances at various gradients such as that contained in the appendix to these comments could also be included in the Engineering Standards.

A simple table of minimum sight distances is insufficient to determine whether visibility is adequate: the location and height of driver and object need to be specified, particularly for roads with horizontal or vertical curvature. Reference could be made to Sheet 4 of the draft Engineering Standards 2021 which defines these parameters.

<sup>2</sup> Austroads Guide to Road Design Part 3: Geometric Design 2016, Section 3.2.2

	<p>Drivers approaching any road should have adequate visibility before driving on to the road. Sight lines AC, BD, CE and ED should apply to all roads. Both driver’s eye height and object height should be set at 1.15m.</p>												
3.2.27.4	<p>We support the clear guidelines for vehicle crossings based on the relationship of entrance movements to main road traffic movements.</p>												
3.2.28	<p>The 4.5 m carriageway width is the bare minimum for a medium truck and car to pass on a straight accessway. Extra widening should be provided on horizontal curves to allow a car and an 8 m rigid truck to pass. This would also allow an 11 m rigid truck to traverse the accessway using the whole carriageway. Extra widening should also be provided on single lane accessways to allow an 11 m rigid truck to traverse the accessway.</p> <p>We recommend that the Engineering Standards include a table of extra widening required on horizontal curves for one and two-lane private accessways based on the above criteria.</p>												
3.2.28 Passing Bays	<p>We recommend adding a section 3.2.28.4 relating to passing bay standards for both urban and rural zones. All single lane accessways should have passing bays as specified in District Plan standard TRAN-S4.</p> <p>As discussed in our comments on standard TRAN-S4, guidance is needed on how to define ‘blind corners’. A better term is ‘safe intervisibility’:</p> <p><i>‘Safe intervisibility’ is where drivers in approaching vehicles have sufficient sight distance to react and for each vehicle to stop in time to avoid a collision. Stopping distances shall take into account operating speeds, reaction times, carriageway surface (sealed or unsealed) and longitudinal gradient.’</i></p> <p>All sections of accessway serving two or more households where safe intervisibility is not achieved should be widened to two-lane.</p> <p>Safe stopping distances should be calculated using Austroads guidelines (refer our comments on ES 3.2.27 and District Plan TRAN-Table 8). On private accessways, drivers are more familiar with the accessway geometry and/or are travelling more slowly compared with a public road and a reaction time of 1.5 seconds is appropriate.</p> <p>We recommend that the Engineering Standards include guidelines for calculating intervisibility. Based on a reaction time of 1.5 seconds, Austroads deceleration rates of 0.36 (sealed) and 0.27 (unsealed) and approach speeds of 30 to 50 km/h, the required intervisibility for two approaching vehicles to stop safely is:</p> <table border="1" data-bbox="395 1720 1238 1886"> <thead> <tr> <th>Operating Speed</th> <th>Sealed</th> <th>Unsealed</th> </tr> </thead> <tbody> <tr> <td>30 km/h</td> <td>45 m</td> <td>50 m</td> </tr> <tr> <td>40 km/h</td> <td>70 m</td> <td>80 m</td> </tr> <tr> <td>50 km/h</td> <td>100 m</td> <td>115 m</td> </tr> </tbody> </table> <p>On vertical curves, intervisibility shall be measured between driver eye heights of 1.15 m above the carriageway.</p> <p>Greater intervisibility is required where the longitudinal gradient exceeds 10%. As longitudinal gradients increase, the sum of the uphill and downhill stopping distances</p>	Operating Speed	Sealed	Unsealed	30 km/h	45 m	50 m	40 km/h	70 m	80 m	50 km/h	100 m	115 m
Operating Speed	Sealed	Unsealed											
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	<p>increase, with significant increases as the gradient approaches the deceleration rate as illustrated below:</p> <p style="text-align: center;">Sealed Accessways</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>V (km/h)</th> <th>0%</th> <th>5%</th> <th>10%</th> <th>15%</th> <th>20%</th> </tr> </thead> <tbody> <tr> <td>30</td> <td>45</td> <td>45</td> <td>46</td> <td>49</td> <td>53</td> </tr> <tr> <td>40</td> <td>68</td> <td>69</td> <td>71</td> <td>76</td> <td>84</td> </tr> <tr> <td>50</td> <td>96</td> <td>97</td> <td>101</td> <td>108</td> <td>121</td> </tr> </tbody> </table> <p style="text-align: center;">Unsealed Accessways</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>V (km/h)</th> <th>0%</th> <th>5%</th> <th>10%</th> <th>15%</th> <th>20%</th> </tr> </thead> <tbody> <tr> <td>30</td> <td>51</td> <td>52</td> <td>55</td> <td>63</td> <td>83</td> </tr> <tr> <td>40</td> <td>80</td> <td>82</td> <td>87</td> <td>101</td> <td>137</td> </tr> <tr> <td>50</td> <td>115</td> <td>117</td> <td>126</td> <td>147</td> <td>203</td> </tr> </tbody> </table> <p>Intervisibility requirements should be calculated using the Austroads formula where the longitudinal gradient exceeds 10%.</p>	V (km/h)	0%	5%	10%	15%	20%	30	45	45	46	49	53	40	68	69	71	76	84	50	96	97	101	108	121	V (km/h)	0%	5%	10%	15%	20%	30	51	52	55	63	83	40	80	82	87	101	137	50	115	117	126	147	203
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<b>Chapter 4</b>	<b>Stormwater and Drainage</b>																																																
4.1.3 to 4.1.6	<p>The District Plan should contain objectives, policies and rules for stormwater management. The role of the Engineering Standards is not to set these policies and rules, but to provide a means of compliance with them.</p> <p>Clause 4.1.3 (h) focusses on not increasing peak discharge rates to receiving waters. While this is appropriate for erosion control and for discharges in upper catchments, avoiding an increase in peak discharge is not always appropriate. In the lower parts of catchments reducing peak flows through stormwater detention can increase flood risk downstream if increased discharges coincide with peak flows in the receiving environment.</p> <p>Clause 4.1.3 (i) is incorrect; Sections 4.3.20 and 4.3.21 do not specify when soakage and stormwater treatment / detention is required, but specify the design parameters <u>when</u> these are required. Section 4.3.8 Table 4-2 specifies when stormwater treatment is required ('always', but refer our comments on Table 4-2 below). The policy and associated rule/standard should be in the District Plan and should specify when stormwater treatment is required.</p>																																																
4.3.8/ Table 4-2	<p>Section 4.3.8 and Table 4-1 stormwater design parameters should be written as means of compliance with District Plan policies and rules and should be amended as necessary to be consistent with District Plan policies and rules.</p> <p><b>Flood control</b> - Attenuation to 80% of pre-development should only be required where <u>buildings</u> are at risk of flooding in the 1% AEP event. Land adjacent to streams is always at risk of flooding and need not be protected. This is the approach taken by NRC in the Regional Plan rules for stormwater discharges.</p>																																																

	<p><b>Flow attenuation</b> – We agree that flow attenuation should normally be designed for 50% and 20% AEP (2 and 5 year ARI) events. As noted above, attenuation to 80% of pre-development should only be required where <u>buildings</u> are at risk of flooding in the 1% AEP event.</p> <p><b>Volume</b> – the volume of stormwater runoff will always increase when a permeable surface (particularly a free draining soil) is replaced with an impermeable surface. Unless soakage is used, it is not possible to match pre- and post-development volumes. Soakage is inappropriate in many areas of the Far North (refer ES sections 4.3.3 and 4.3.20). Channel protection is provided by attenuation of the 50% and 20% AEP events. The additional ‘volume’ requirement is unnecessary and should be deleted.</p> <p><b>Water quality treatment</b> should only be required if the water quality requirements of Regional Plan rules C.6.4.1 and C.6.4.2 are not met. Runoff from roofs and concrete surfaces will generally be clean and meet the specified water quality standards.</p> <p>The requirement for when ‘water quality treatment’ and ‘water quality treatment volume’ are required is not ‘Always’, but ‘<i>When water quality treatment is required to meet the permitted activity rules of the Regional Plan</i>’.</p>
<p>4.3.9/ Table 4-2</p>	<p>The draft Engineering Standards Table 4-2 specifies a design rainfall for primary system to 50% and 20% AEP events whereas Performance Standard 4.1.3 (e) and District Plan subdivision rule SUB-S5 specifies 10% AEP (10 year ARI). The Engineering Standards and District Plan should be consistent.</p> <p>The Notes below Table 4-2 should be amended. NIWA HIRDS V4 provides for increases in rainfall intensity as a result of climate change. It is normal practice to apply RCP 6.0 climate change scenario projected out to the 2081-2100 time period. This accounts for 1.63°C of warming and an associated increase in rainfall of approximately 20%.</p> <p>Rainfall intensity adjusted for climate change should be used for calculating <u>both</u> pre-development and post-development runoff. Climate change and increased runoff will occur even if development does not.</p>
<p>4.3.9/ Table 4-3</p>	<p>We have concerns about the way in which design values detailed in Auckland Council TP108 and NZ Building Code E1 have been modified for the Engineering Standards. TP108 is based on the US Soil Conservation Service TR-55 (1986) and validated for Auckland conditions. The validated curve numbers developed for Auckland conditions are applicable to similar Northland conditions. However, care should be taken when using the US SCS curve numbers which have not been validated for Auckland conditions.</p> <p>The soil types proposed in the draft Engineering Standards are inconsistent with TP108 Tables 3.2 and 3.3. These tables which have been validated for Auckland conditions should be used in preference to the US SCS curve numbers when carrying out a TP108 analysis in the Far North District.</p> <p>Runoff coefficients C proposed in the draft Engineering Standards for use in the Rational Method are too high and do not take into account infiltration during low intensity rainfall events or surface storage during short duration events. The Engineering Standards state that the C values have been derived from TP108 CN values. There are significant differences in the methodology between TP08 and the rational formula. TP108 uses a 24 hour rainfall</p>

	<p>event, while the rational formula uses shorter rainfall durations (usually 10 minutes) based on the time of concentration for the catchment. We cannot find any correlation in TP108 between CN curve numbers and C value runoff coefficients for the rational method, and would not expect to find such a correlation.</p> <p>The Building Code is continually updated in the light of new technical advice. We have not seen any evidence that indicates the rational formula runoff coefficients recommended in E1 are incorrect for Northland and we recommend that the Building Code E1 runoff coefficients be used.</p>
4.3.13.4	Reference made to the National Environmental Standards for Freshwater Regulations 2020 Rule 70.
4.3.20	<p>Paragraphs (d) (e) and (g) are mutually contradictory – infiltration systems such as swale drains need to be located in overland flow paths to intercept stormwater runoff.</p> <p>We recommend that paragraph (e) be amended as follows:</p> <p><i>(e) infiltration devices shall be located away from overland flow paths from neighbouring properties.</i></p>
<b>Chapter 5</b>	<b>Wastewater</b>
5.1.5.3	Delete paragraph (a). The lot area is a District Plan matter and is not relevant to the engineering standards. Some existing lots with on-site wastewater disposal are less than 2000m <sup>2</sup> and would not comply with this provision. The requirement to comply with Regional Plan rules for wastewater disposal (paragraph b) ensures on-site wastewater disposal is appropriate.

Austrroads Guide to Road Design Part 4a Intersections 2017

Guide to Road Design Part 4A: Unsignalised and Signalised Intersections

**Table 3.1: Approach sight distance (ASD) and corresponding minimum crest vertical curve size for sealed roads (S < L)**

Design speed (km/h)	Based on approach sight distance for a car <sup>(1)</sup> $h_1 = 1.1, h_2 = 0, d = 0.36^{(2)}$					
	$R_T = 1.5 \text{ sec}^{(3)}$		$R_T = 2.0 \text{ sec}$		$R_T = 2.5 \text{ sec}$	
	ASD (m)	K	ASD (m)	K	ASD (m)	K
40	34	5.3	40	7.2	–	–
50	48	10.5	55	13.8	–	–
60	64	18.8	73	24.0	–	–
70	83	31.1	92	38.9	–	–
80	103	48.5	114	59.5	–	–
90	126	72.3	139	87.3	151	104
100	151	104	165	124	179	146
110	–	–	193	171	209	198
120	–	–	224	229	241	264
130	–	–	257	301	275	344
Truck stopping capability provided by the minimum crest curve size <sup>(4)</sup>	$h_1 = 2.4 \text{ m}, h_2 = 0 \text{ m}, d = 0.22$					

- 1 If the average grade over the braking length is not zero, calculate the approach sight distance (ASD) values using the correction factors in Table 3.4 (or use Equation 1) by applying the average grade over the braking length.
- 2 In constrained locations (typically lower volume roads, less important roads, mountainous roads, lower speed urban roads and tunnels), a coefficient of deceleration of 0.46 may be used. For any horizontal curve with a side friction factor greater than the desirable maximum value for cars (in constrained locations), use a coefficient of deceleration of 0.41. The resultant crest curve size can then be calculated using the relevant equations in AGRD Part 3 (Austrroads 2016b).
- 3 A 1.5 sec reaction time is only to be used in constrained situations where drivers will be alert. Typical situations are given in Table 5.2 of AGRD Part 3. The general minimum reaction time is 2 sec.
- 4 This check case assumes the same combination of design speed and reaction time as those listed in the table, except that the 120 km/h and 130 km/h speeds are not used.

Notes:

K is the length of vertical curve in metres for a 1% grade change.

Main Roads Western Australia has adopted a desirable minimum reaction time of 2.5 sec and an absolute minimum reaction time of 2.0 sec. A reaction time of 1.5 sec is not to be used in Western Australia.

Combinations of design speed and reaction times not shown in this table are generally not used.

Refer to AGRD Part 3 to determine the ASD for trucks around horizontal curves.