

STANDARDISING STANDARDS & CREATING 'BEST PRACTICE'

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Abstract

Why do we need a separate standard for each Council? The reality is that as engineers we want to solve problems for our clients whether they are a Council, Industry or ratepayer, we want to make things better. Over time, we have created a problem with differing standards for each district we work in, with few connections across the country. This is creating economic inefficiencies in both construction from 'learning time', non-standard components and management of standards.

The reasons for differing standards normally are valid; variations in ground conditions, coastal versus landlocked regions, earthquake vulnerability or flooding issues. However no District is unique and, in order to create best practices, we need to lay our 'cards' on the table. We need to make it easier to share engineering standards and promote great ideas. This is how the future of sustainable local government will progress.

This paper will show how we create sustainable communities and share knowledge by creating a one stop shop for NZ Council Engineering Standards, as a first step to creating a more standard, standard!

Key Words

Best Practice, Asset Management, Public Works Best Practice, Technology, Standards, Engineering

Introduction

In New Zealand there are 78 local authorities. This comprises of:

- 11 Regional councils and
- 11 City Councils (Territorial)
- 50 District Councils (Territorial)
- 6 Unitary Councils (Including Auckland)

The smallest territorial council is the Wairoa District Council with 7,890 residents (2013 Census). The largest territorial Council is Christchurch City Council with 341,469 residents (2013 Census). The median population for territorial councils in NZ is only 30,096.

Land and infrastructure development in the local government context has seen innovation grown over the past decade. The availability of new materials and products on the market has seen improved efficiencies in production and in

the supply costs of certain products. However there is still an inconsistency in the application of standards across local government both regionally and nationally.

Modern New Zealand is a highly connected and highly mobile country. The availability of technology has broken down the traditional local government territorial barriers and there is a greater trend to infrastructure design and development design centres operating across boundaries both national and international.

This cross border working raises the question of inefficiencies with territorial specific infrastructure design standards. There is potential for one designer to work on multiple projects in different regions each with their own specific standard. Similarly a supplier may have approval to supply standard products to one council but for another council there is a unique design or solution required. This paper

aims to encourage discussion of the scale of the issue and to promote a move towards open sourced design standards and improving innovation.

Quantifying the scale of the problem

In order to quantify the scale of the issue of infrastructure design standards an online literature search was undertaken to determine the number of councils standards available online. Table 1 details the number of infrastructure design standards across New Zealand.

It is apparent that the industry has over 40 different territorial or regional council infrastructure design codes, with 17 Council codes not readily available online. With such a large number of Councils and with such a small median resident

population it doesn't make economic sense for each Council to operate in relative technical isolation for infrastructure standards.

When we look at the territorial councils, 23 out of the 61 councils with a population of under 50,000 residents have their own infrastructure design standards. The smallest council with a standard available online has only 8,436 residents.

When we analyse the number of territorial councils and look at their resident population we can see that are significant inefficiencies for industry and for local government in ensuring that the products, materials and services are nationally acceptable.

Table 1 New Zealand Infrastructure Design Standards by Council Type

Council Type	Total	Engineering/Land Development Standards Available Online	Solely Based on NZS 4404	Council Combined Standards	Information Not Readily Available online
Territorial	61	36	5	3	17
Unitary	6	4	2		
Regional	11				

Inefficiencies from multiple Infrastructure Standards

The Local Government Act 2002 set in law the definition of 'Promotion of good local government' to include:

'improved economic performance, which may (without limitation) include—

- (i) efficiencies and cost savings; and
- (ii) productivity improvements, both within the local authorities and for the businesses and households that interact with those local authorities; and
- (iii) simplified planning processes within and across the affected area through, for example the

integration of statutory plans or a reduction in the number of plans to be prepared or approved by a local authority.'

This definition of good local government highlights the need to provide efficiencies, cost savings and productivity improvements that extends beyond local government activities into those for businesses and residents.

The majority of local government infrastructure standards have the same principle elements with minor changes. The time and effort in developing and maintaining duplicate standards can be

seen across the Country. This then flows on through to the manufacturing of components and products for infrastructure services.

Minor variations in design standards mean that different products may be acceptable in different regions across the Country. Therefore the overall cost of infrastructure also increases due to specials or unique products being produced. Conversely if we had consistent set standards for all Councils the unit rate for infrastructure components could drop due to economies of scale and competition across the industry.

We already have a 'standard' standard – NZS4404

NZS 4404 has been available in the industry in its many formations since NZS4404:1981 Code of Practice for Urban Land Subdivision to the NZS4404:2004 Land Development and Subdivision Engineering Standard and in its current 2010 form encouraging multiuse developments and innovation.

The incorporation of "Engineering Standard" into its title is no doubt an attempt to encourage further adoption as a standard for wider use. So why hasn't there been a greater uptake of NZS 4404?

The diversity of both demographics (rural vs urban) and local geography (coastal vs inland plains) is commonly used as reasons for the difference in design and specifications of infrastructure. However NZS 4404 was developed to allow for a consistency throughout the country while allowing for regional and geographical differences.

Engineering or historical council experiences with certain projects will be a strong factor in the decision to change or alter the standard. Engineers, by their nature, desire to improve on standards or adjust them to achieve 'best practice' for their infrastructure.

However NZS4404 could be further revised to include appendices for specific variations, removing some of the reasons given for different standards. E.g.

- Baseline Document NZS 4404
- Variation 1: Earthquake prone areas
- Variation 2: Flood prone areas
- Variation 3: Steep Terrain
- Variation 4: Rural Areas

This would allow for regional geographic and demographic differences while maintaining a national standard for best practice.

Developing Best Practice

Standards by their nature should be a quality baseline that requires infrastructure development to meet minimum requirements for performance. As the industry develops and new materials and products emerge the standard may require changing to suit. This develops a new baseline for which the industry can benchmark performance of future works, incrementally driving efficient infrastructure delivery. Additionally investment in innovative materials or products could become more financially viable if there was consistency across local government standards.

The model for delivery of large design projects for local government infrastructure or land development is no longer geographically isolated. Design for complex land development is more commonly being completed through larger design centres where specialists are co-located. It is rare that a project or programme may be large enough to justify the co-location of large numbers of infrastructure specialists, as was the case in the establishment of the SCIRT office.

The design centres may be completing projects in multiple locations concurrently each with an individual design standard or specification. This ability to see the differences also enables the designer to have an overview of the nuances between the standards and recommend the best practice approach.

Currently there is no one central location to find the infrastructure standards or specifications developed by various entities across New Zealand. This lack of visibility of other standards also limits the ability to streamline differences between other regions and limits the ability for developing a best practice standard. This extends to the conditions of engagement and specifications for construction works.

It is acknowledged that Local Government New Zealand has established Equip as LGNZ's Centre of Excellence to provide best practice guidance to strengthen the local government sector. IPWEA also needs to take a lead in promoting and developing the use of best practice standards in NZ.

Steps to creating a more standard 'standard'

Creating a centralised location for registering local government standards.

Providing a centralised location as a portal for access to local council design standards helps to encourage awareness of existing standards for specific topography and hazards. It enables designs to easily find design standards for coastal regions, earthquake prone or flood prone council areas.

The website www.nzcouncilstandards.org has been set up as a simple site to encourage discussion and provide quick access to all New Zealand council infrastructure standards that are available online. Screenshots from the website can be seen in Figure 1 and Figure 2.

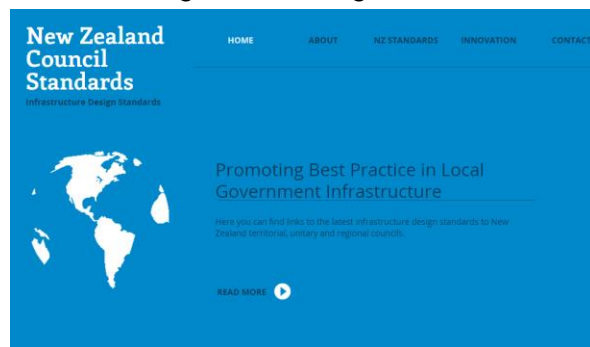


Figure 1 New Zealand Council Standards Website Screenshot

Island	Region	Type	Councils	Council Website	Population	Link to Engineering Standards
North Island	Auckland	Unitary	Auckland Council	http://www.aucklandcouncil.govt.nz	1,415,500	http://www.aucklandcouncil.govt.nz
North Island	Auckland	Unitary	Auckland Regional	http://www.aucklandregional.govt.nz		http://www.aucklandregional.govt.nz
North Island	Auckland	Unitary	Auckland Watercare	http://www.watercare.co.nz		http://www.watercare.co.nz
North Island	Bay of Plenty	Regional	Bay of Plenty Regional Council	http://www.boprc.govt.nz	267,741	http://www.boprc.govt.nz
North Island	Bay of Plenty	Regional	Bay of Plenty Regional Council	http://www.boprc.govt.nz	119,708	http://www.boprc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	66,286	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Western Bay of Plenty Regional Council	http://www.westernbay.govt.nz	43,662	http://www.westernbay.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	10,001	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	South Waikato Regional Council	http://www.southwaikato.govt.nz	8,436	http://www.southwaikato.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	6,393	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	43,053	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	193,179	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	77,245	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	57,240	http://www.wrc.govt.nz
North Island	Bay of Plenty	Regional	Waikato Regional Council	http://www.wrc.govt.nz	143,016	http://www.wrc.govt.nz

Figure 2 Links to New Zealand Council Websites and Development Standards

The website can easily be updated to provide new links to infrastructure standards or provide advice on where to find more information.

Promoting Regional Consolidation of Design Standards using NZS 4404

Regionalised design standards could help to mitigate the argument of geography and topography. Through encouraging a consistent design standard from the regional council level it helps to provide design standards for the smaller territorial councils and will provide efficiency in both the supply of materials and the quality of local government delivered infrastructure.

Examples of regionalised standards include:

- The Auckland Council and the combination of several individual council standards into Auckland Council Development Standards, Watercare standards and Auckland Transport. The Watercare standard is based on NZS4404 and incorporates best practice where possible.
- The Wellington Regional Standard for Water Services November 2012 is a collaboration between Wellington City, Hutt City, Upper Hutt City, Poirirua and Capacity Infrastructure Services. This established a regional water standard for development within the Greater Wellington Area.
- The Hamilton Infrastructure Technical Specifications and the Hamilton City Development

Manual is used as a regional development standard in the Sub Regional Waikato. Hamilton City Council, Otorohanga, Waikato District Council and Waitomo promote the use of the standard. The standard includes a rural chapter and Waikato addendum. This approach is readily replicated in other regions in NZ.

Advantages to creating a more standard 'standard'

Amalgamation and Shared services.

The foundations of design and scheme development need to be established with the push to consider amalgamation of neighbouring territorial authorities. The regional standards, as shown in the examples above, enable a consistent design approach and expectation of infrastructure performance when amalgamation is achieved.

Even outside of a process where amalgamation is being considered, neighbouring councils may wish to consider implementing a shared services model to balance the needs of each party involved. A common baseline would therefore be required before this could be considered.

Design Efficiencies

As an industry, we need to ensure that we are providing a high quality and efficient service to our communities. With uniform standards, the designers, (whether internal or external to the council organisation) will be more consistent with the level and quality of delivery, and more knowledgeable about the expectations of deliverables. This would flow on to individuals that may move between the private and public sectors having more transferable knowledge and experience.

Conclusion

This paper highlights that with over 40 variations of council infrastructure design standards, there is a clear need to consolidate this number in a nation as small as New Zealand. Reducing the number of isolated engineering design standards could help produce more productivity and cost efficiency for infrastructure development.

Encouraging and promoting the use of NZS 4404 in its current form is key to improving the standardisation of infrastructure development in New Zealand.

Regional approaches to standardising existing territorial design standards between adjacent Councils have been successful and could easily be implemented in other regions. This could be the most effective approach to encouraging collaboration between Councils and rationalising the approach to engineering standards development.

This paper recommends that:

- a stepped approach to consolidating territorial design standards should be undertaken.
- IPWEA establishes a working group along with other industry members and stakeholders to collate and develop this network to rationalise the engineering standards.
- local government follows the regionalised or shared services approach to rationalise their standards.
- future infrastructure standards should use NZS4404 as their base document with nationally accepted variations. They should allow flexibility for innovation and improvements in technology.

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<http://www.localcouncils.govt.nz/>

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Auckland - Watercare	www.watercare.co.nz/
Auckland Council	http://www.aucklandcouncil.govt.nz/
Auckland Transport	https://at.govt.nz/
Bay of Plenty Regional Council	http://www.boprc.govt.nz/
Buller District Council	http://bullerdc.govt.nz/
Canterbury Regional Council	http://www.ecan.govt.nz/pages/home.aspx
Carterton District Council	http://www.cartertondc.co.nz/
Central Hawke's Bay District Council	http://www.chbdc.govt.nz/
Central Otago District Council	http://www.codc.govt.nz/Pages/default.aspx
Chatham Islands Council	http://www.cic.govt.nz/
Christchurch City Council	http://www.ccc.govt.nz/
Clutha District Council	http://www.cluthadc.govt.nz/
Dunedin City Council	http://www.dunedin.govt.nz/
Far North District Council	http://www.fndc.govt.nz/home
Gisborne District Council	http://www.gdc.govt.nz/
Gore District Council	http://www.goredc.govt.nz/
Grey District Council	http://www.greydc.govt.nz/Pages/default.aspx
Hamilton City Council	http://www.hamilton.govt.nz/Pages/default.aspx
Hastings District Council	http://www.hastingsdc.govt.nz/
Hauraki District Council	http://www.hauraki-dc.govt.nz/
Hawke's Bay Regional Council	http://www.hbrc.govt.nz/Pages/default.aspx
Horowhenua District Council	http://www.horowhenua.govt.nz/
Hurunui District Council	http://www.hurunui.govt.nz/
Hutt City Council	http://www.huttcity.govt.nz/
Invercargill City Council	http://icc.govt.nz/
Kaikoura District Council	http://www.kaikoura.govt.nz/
Kaipara District Council	http://www.kaipara.govt.nz/
Kapiti Coast District Council	http://www.kapiticoast.govt.nz/
Kawerau District Council	http://www.kaweraudc.govt.nz/
Mackenzie District Council	http://www.mackenzie.govt.nz/

<u>Manawatu District Council</u>	http://www.mdc.govt.nz/Home
<u>Manawatu-Wanganui Regional Council</u>	http://www.horizons.govt.nz/
<u>Marlborough District Council</u>	http://www.marlborough.govt.nz/
<u>Masterton District Council</u>	http://www.mstn.govt.nz/index.php
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<u>New Plymouth District Council</u>	http://www.newplymouthnz.com/
<u>Northland Regional Council</u>	http://www.nrc.govt.nz/
<u>Opotiki District Council</u>	http://www.odc.govt.nz/
<u>Otago Regional Council</u>	http://www.orc.govt.nz/
<u>Otorohanga District Council</u>	http://www.otodc.govt.nz/
<u>Palmerston North City Council</u>	http://www.pncc.govt.nz/
<u>Porirua City Council</u>	http://www.pcc.govt.nz/
<u>Queenstown-Lakes District Council</u>	http://www.qldc.govt.nz/
<u>Rangitikei District Council</u>	http://www.rangdc.govt.nz/
<u>Rotorua District Council</u>	http://www.rdc.govt.nz/Pages/default.aspx
<u>Ruapehu District Council</u>	http://www.ruapehudc.govt.nz/Site/Home.ashx
<u>Selwyn District Council</u>	http://www.selwyn.govt.nz/home
<u>South Taranaki District Council</u>	http://www.stdco.co.nz/
<u>South Waikato District Council</u>	http://www.southwaikato.govt.nz/Pages/default.aspx
<u>South Wairarapa District Council</u>	http://www.swdc.govt.nz/
<u>Southland District Council</u>	http://www.southlanddc.govt.nz/
<u>Southland Regional Council</u>	http://www.es.govt.nz/
<u>Stratford District Council</u>	http://www.stratford.govt.nz/
<u>Taranaki Regional Council</u>	http://www.trc.govt.nz/
<u>Tararua District Council</u>	http://www.tararoadc.govt.nz/Home
<u>Tasman District Council</u>	http://www.tasman.govt.nz/
<u>Taupo District Council</u>	http://www.taupodc.govt.nz/Pages/default.aspx
<u>Tauranga City Council</u>	http://www.tauranga.govt.nz/
<u>Thames-Coromandel District Council</u>	http://www.tcdc.govt.nz/
<u>Timaru District Council</u>	http://www.timaru.govt.nz/home
<u>Upper Hutt City Council</u>	http://www.upperhuttcity.com/
<u>Waikato District Council</u>	http://www.waikatodistrict.govt.nz/
<u>Waikato Regional Council</u>	http://www.ew.govt.nz/
<u>Waimakariri District Council</u>	http://www.waimakariri.govt.nz/home.aspx
<u>Waimate District Council</u>	http://www.waimatedc.govt.nz/home

<u>Waipa District Council</u>	<u>http://www.waipadc.govt.nz/Pages/default.aspx</u>
<u>Wairoa District Council</u>	<u>http://www.wairoadc.govt.nz/wairoa/index.htm</u>
<u>Waitaki District Council</u>	<u>http://www.waitaki.govt.nz/RestrictedSitePages/Sliding_Home.aspx</u>
<u>Waitomo District Council</u>	<u>http://www.waitomo.govt.nz/</u>
<u>Wanganui District Council</u>	<u>http://www.wanganui.govt.nz/</u>
<u>Wellington City Council</u>	<u>http://wellington.govt.nz/</u>
<u>Wellington Regional Council</u>	<u>http://www.gw.govt.nz/</u>
<u>West Coast Regional Council</u>	<u>http://www.wcrc.govt.nz/Pages/default.aspx</u>
<u>Western Bay of Plenty District Council</u>	<u>http://www.westernbay.govt.nz/Pages/default.aspx</u>
<u>Westland District Council</u>	<u>https://www.westlanddc.govt.nz/</u>
<u>Whakatane District Council</u>	<u>http://www.whakatane.govt.nz/</u>
<u>Whangarei District Council</u>	<u>http://www.wdc.govt.nz/</u>

Author Biography & Photograph



Chris is a Project Manager and Water Resources Engineer with experience in water, stormwater and wastewater infrastructure. He has exceptional communication skills, focused on building and strengthening client relations, with a systematic and personal approach to engineering. Chris works with local government on water resources engineering projects involving infrastructure design, project management, asset management and operational roles.

Chris is currently the project manager for the delivery of Canterbury local government infrastructure projects for MWH where he regularly works with technical specialists in multi-office teams across New Zealand and Australia. He was seconded into the Stronger Christchurch Infrastructure Rebuild Team from 2011 to 2013 and is a past Chairman of the Institution of Professional Engineers Canterbury Branch (2013).

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