

Land Development Minimum Requirements



Published by the Kāpiti Coast District Council

April 2022

Also available on the Council's website at www.kapiticoast.govt.nz

Copyright Kāpiti Coast District Council

Contents

Part 1 Context	5
Introduction	5
Purpose and outcomes	5
Resource Management Act 1991 (RMA)	6
Building Act 2004	7
Local Government Act 2002 (LGA)	7
Quality urban design	7
Design-led approach	8
Design and review meetings	10
Part 2: Development process	13
A. Preliminary	13
B. Concept plans	15
C. Resource consents	16
D. Development impact fees	24
E. Assessment of environmental effects	24
F. Scheme plans	25
G. Contaminated sites and hazardous areas	28
H. Water permits and water quality	28
I. Checklists	30
Part 3: Development requirements	33
A. Development approaches	33
B. General provisions	34
C. Earthworks and geotechnical	45
D. Transportation	47
E. Stormwater	54
F. Wastewater	65
G. Water Supply	73
H. Landscape	77
I. Network utility services	80
J. Waste services	82
Part 4: Minimum engineering requirements	84
Introduction	84
Schedule 1: Kāpiti Coast District Council Altered requirements to Section 1 NZS 4404:2010 General requirements and procedures	85
Schedule 2: Kāpiti Coast District Council Altered requirements to Section 2 NZS 4404:2010 Earthworks and geotechnical requirements	96
Schedule 3: Kāpiti Coast District Council 100 Altered requirements to Section 3 NZS 4404:2010 Roads	100
Schedule 3 Appendix 1: Lighting categories	114
Schedule 4: Kāpiti Coast District Council Altered requirements to Section 4 NZS 4404:2010, Stormwater	118
Appendix 1: Updated Ishohyet-based Calculation of Design Peakflows	128

1. Introduction	131
2. Background	132
3. Haestad's Graphical Hec-113	139
4. US Army Corps Engineers HEC-HMS	142
5. Model Limitations	147
6. Worked Example	148
7. References	155
Appendix A: Rainfall Recurrence Isohyet Maps	157
Appendix B: Curve Number Delineation Tables	170
Appendix C: Time of Concentration Calculations	175
Schedule 5: Kāpiti Coast District Council Altered requirements to Section 5 NZS 4404:2010 Wastewater	174
Schedule 6: Kāpiti Coast District Council Altered requirements to Section 6 NZS 4404:2010 Water supply	184
Schedule 6 Appendix 1 – points of supply and typical layouts	193
Schedule 7: Kāpiti Coast District Council Altered requirements to Section 7 NZS 4404:2010 Landscape	197
Schedule 8: Kāpiti Coast District Council Altered requirements to Section 8 NZS 4404:2010 Network utility services	200

Figures

Figure 1: Context and linkages of framework to subdivision and development within Kāpiti Coast District Council's planning activities	9
Figure 2: Integrated decision-making process	11
Figure 3: One Network Framework – New Zealand's national classification system	49

Part 1 Context

Introduction

The Kāpiti Coast District is experiencing significant growth and development pressures. The Council is committed to supporting quality growth – that is growth that supports key outcomes, such as the protection of freshwater and productive soils, and building resilience to the impacts of climate change.

This document, the Council's Land Development Minimum Requirements, contains the minimum design and construction requirements for all new developments within the Kāpiti Coast District – both permitted and consented that Council is willing to accept. All development must be consistent with the Kāpiti Coast District Plan objectives, policies and rules and other Resource Management Act 1991 (RMA) requirements. Where new infrastructure functions as part of the Council's network (either through vesting as a Council asset, or through its connection to Council's infrastructure) then the requirements in this document also need to be met.

In setting these requirements, Council has considered:

- central government direction including the NPS-Freshwater, the NPS-Urban Development and Te Mana o Te Wai
- Greater Wellington Regional Council's requirements, including the Proposed Natural Resources Plan and the Council's consent conditions
- Council's Infrastructure Strategy
- Council's Asset Management Plans.

Purpose and outcomes

The purpose of the Council's Land Development Minimum Requirements document is to provide standards and guidance for the design, construction and maintenance of any asset that:

- A is intended to be vested in the Council and so will become part of its asset network,
or
- B connects to, or otherwise impacts on, the function of Council's network assets, or

C in the event of failure, impacts on Council's network and/or neighbouring properties.

The outcomes Council wishes to deliver is quality infrastructure that:

1. supports the health, safety and wellbeing of people and communities
2. contributes to protecting, restoring, connecting, and enhancing the natural environment
3. delivers multiple, integrated outcomes
4. supports safety in design
5. is resilient to natural hazards and climate change effects
6. meets levels of service set out in Council's Asset Management Plans and Long-term Plan
7. is affordable over the whole of life of the asset
8. adopts innovative, water-sensitive design solutions where network performance, environmental outcomes and cost effectiveness can be achieved
9. embraces a Te Ao Māori perspective (Māori world view) and takes an integrated management approach, recognising the interconnectedness of the environment and the interactions between its parts.

Resource Management Act 1991 (RMA)

The Resource Management Act (RMA) is concerned with promoting the sustainable management of natural and physical resources. Emphasis is placed on environmental outcomes and the integrated management of the effects of activities on the environment. Environmental management under the RMA is intended to be outcome orientated, and this provides challenges for both developers and the Council.

The Act provides for effects-based, regional and district plans through which implementing new and innovative solutions for development can be undertaken. However, the successful adoption of new and innovative designs depends to some degree upon certainty in the resource consent process.

Section 11 of the RMA requires local authorities to control subdivision of land. It prevents subdivision unless there is a rule in a district plan or national environmental statement allowing it. Historically, until 2005, the Council's response had been mainly through rules and standards defined in the district plan and through a prescriptive code for subdivision and development. Although that code was only one means of compliance, it tended to become the norm because of the certainty it provided in the resource consent process.

The RMA was amended in 2021 to require district plans to better enable housing intensification in urban areas from late 2022. The changes signal that residential sites can be developed to provide up to three dwellings as a permitted land-use activity, subject to specified standards. The requirements in this document will apply to these developments.

Building Act 2004

When infrastructure is proposed which remains private, its provision may also require a building consent. Developers should identify early in the design process what district plan requirements are triggered to ensure integrated design solutions are not 'sterilised' by subsequent consenting decisions. This also reduces the amount of 're-working' or variations that may be required to accommodate different statutory requirements.

Local Government Act 2002 (LGA)

The Local Government Act (LGA) requires territorial authorities to set levels of service for their assets and activities. These balance community need with affordability. Any assets that are to be vested in the Council must contribute to the identified levels of service. Assets that remain in private ownership, but that functionally act as part of Council's network (e.g. stormwater devices) must also contribute to the identified levels of service.

Under the LGA, Council must develop an infrastructure strategy and a financial strategy. These set out its approach to managing and funding the district's core infrastructure services (transport, stormwater, water supply, wastewater and coastal assets) for the next 30 years.

Quality urban design

As a signatory to the New Zealand Urban Design Protocol, the Council is committed to creating quality urban design. This includes ensuring all its capital works show quality urban design and actively encouraging the development community to provide for good urban design. The Council has, and continues to, encourage local developers to sign the protocol.

In 2022, the Council adopted a Growth Strategy (Te tupu pai – Growing well) which guides the way development should progress in the district. The strategy includes consideration of a number of sustainable development principles previously adopted by the Council.

The Council wishes to promote up-to-date design and construction methodologies in subdivision developments to provide for best environmental practice in terms of both design

and provision of services. It is promoting these methods of compliance by including them in the district plan and providing design guides.

The Council's approach requires applicants to meet the general requirements and design criteria set out in this document, to be consistent with the principles outlined in the Council's design guides, and also to meet the Council's minimum engineering requirements.

The Council's suite of design guides will evolve in response to the strategic direction of the district, environmental concerns and service and infrastructure constraints, and as the Council implements central and regional government directives. Applicants should ensure they are working with the most recently adopted versions and cover relevant aspects of these guidelines in their resource consent applications (to the extent applicable).

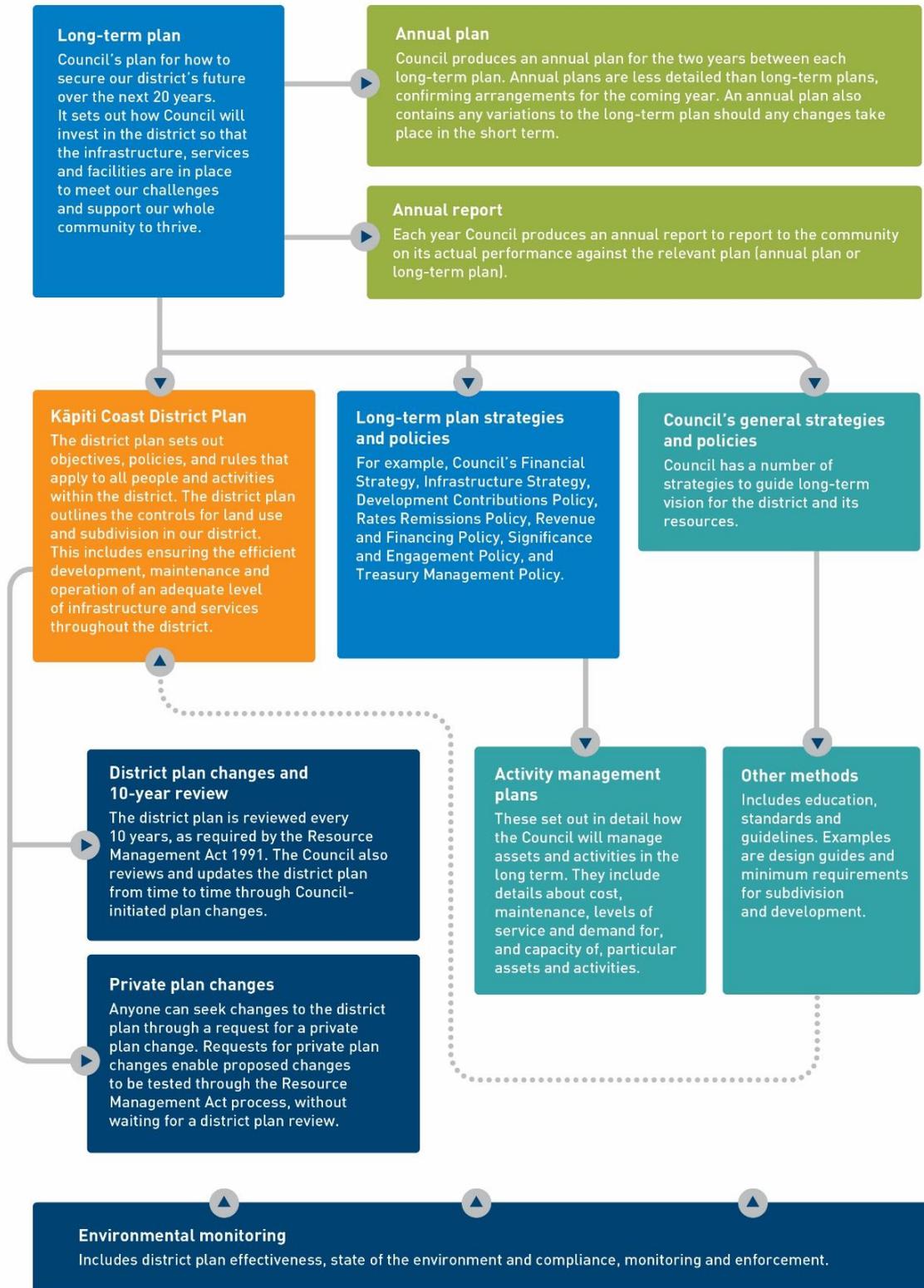
The Council's approach interacts with the district plan provisions and its strategic and community directions, as illustrated in figure 1 on the following page.

The Council's policies are also evolving in response to new strategic directions, environmental concerns and additional service and infrastructure constraints within the district. These include supporting the quality and character of our town centres and neighbourhoods, avoiding or mitigating natural hazards (including climate change), providing adequate potable water supplies, treating and disposing of wastewater, dealing with stormwater issues (including its treatment) and designing roads. These are all relevant to development planning and need to be considered in development proposals.

Design-led approach

The Council requires developers to take a coherent, design-led approach, particularly for larger developments and environmentally sensitive sites. This will allow integration across Council departments and partnering agencies as well as with national directions and legislative changes. Accordingly, the Council's approach to subdivision, intensification and development within the Kāpiti Coast district has been considered alongside the direction of the Local Government Act 2002, and community planning's impacts on future Council activities and subdivision and development.

Figure 1: Context and linkages of framework to subdivision and development within Kāpiti Coast District Council's planning activities



Developers should work through the process of identifying integrated design solutions that provide fit-for-purpose outcomes. They should be familiar with the statutory 'bottom lines' which are likely to constrain the development. For example, proposed minimum road widths or building off-sets must be able to accommodate all supporting infrastructure and services (e.g. three waters, telecommunications and waste disposal access) as well as bus services where required. The Council's minimum engineering requirements should be used as a baseline and can be met by using the New Zealand Standard NZS 4404:2010 (incorporating the *Land Development Minimum Requirements* schedules that provide specific design information and other Council requirements that may differ from those in NZS 4404:2010).

Design and review meetings

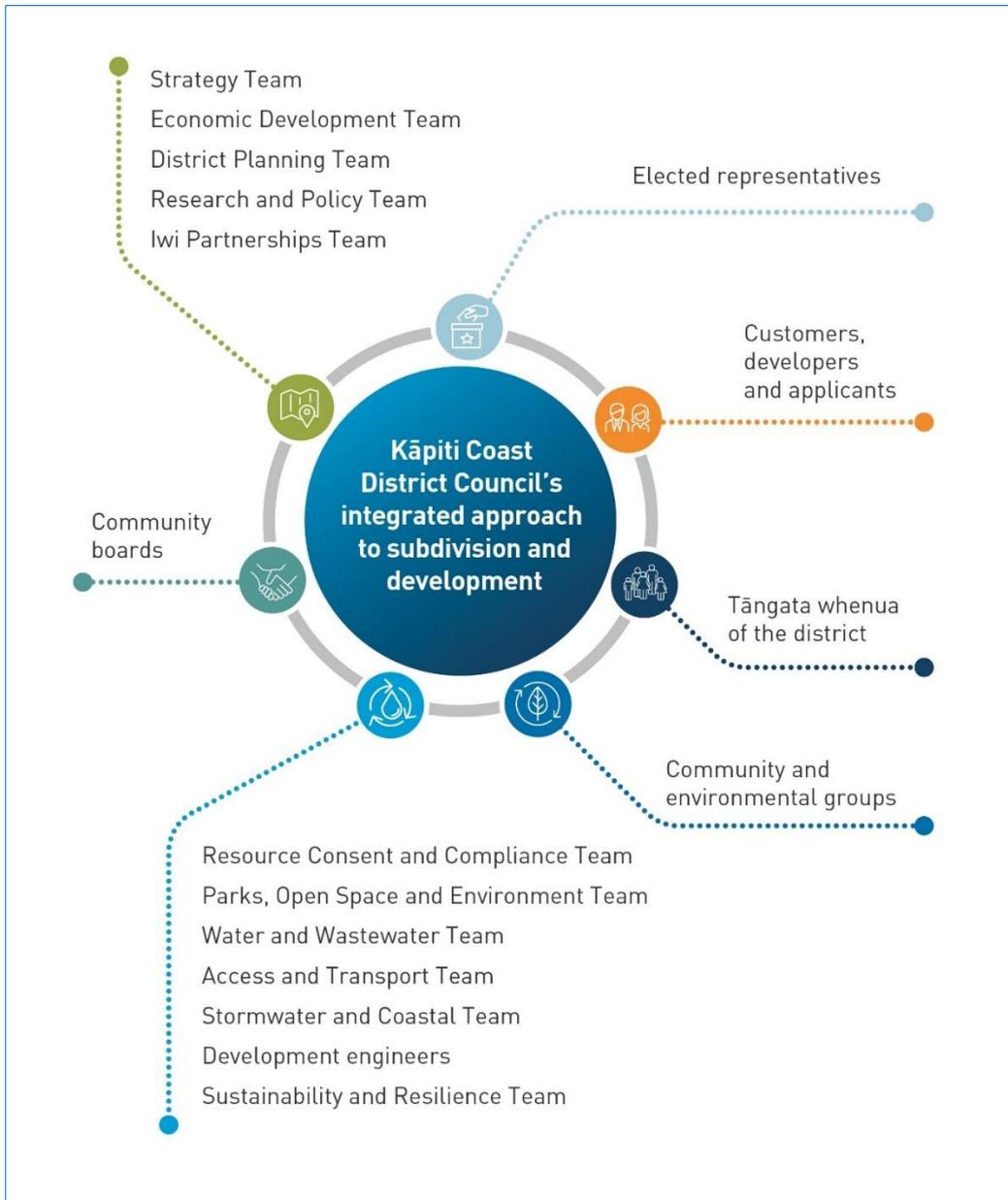
A design and review meeting service is available to enable all parties – applicants, the developer's representative and Council staff (engineering, resource consents, building consents, stormwater, roading, wastewater, open space and policy) – to examine proposals in an interactive and integrated manner. These meetings will be an opportunity for applicants to get advice on early design concepts or the development of engineering drawings, recognising that compromises may be needed in some areas for the benefit of others. This approach is the essence of sustainable management and provides for dialogue between Council staff, applicants and the community to ensure an integrated approach.

The system seeks to support the use of alternative designs and technologies so it is flexible enough to allow for innovation. It provides options for alternatives or innovative designs that a developer may wish to propose. While compliance with minimum standards is still available for those situations where alternatives are inappropriate, all solutions must be fit for purpose and not impose unknown or excessive costs on the Council for future operations and maintenance. To encourage innovative design, developers should discuss their development concepts with the Council at an early stage (pre-application) and again at engineering drawing development stage. This integrated approach is shown in figure 2 on the next page.

Council needs to approve any new environmental technology, material or process for use in the network. Therefore, where developers propose using alternative subdivision design and environmental technologies, they must provide information about the long-term operation, maintenance and success of these technologies. It is important data is available on the expected lifespan of any technologies used, and the applicant should provide details of operations, maintenance schedules and requirements to allow Council to calculate whole-of-life costs and have enough information to decide whether to approve the technologies.

Any applications for assets that will remain in private ownership must identify who has responsibility for maintaining and replacing the asset over its life cycle, and the legal instrument that will be used to ensure ongoing compliance. Council will assess each application against criteria which include guidelines on how to deal with issues such as asset management, private versus public ownership of infrastructure, and future maintenance of components in an alternative design approach. Private ownership should not be used as a way to reduce construction standards on site.

Figure 2: Integrated decision-making process



Contents: Part 2 Development process

A	Preliminary	13
B	Concept plans	15
C	Resource consents	16
D	Development impact fees	24
E	Assessment of environmental effects	24
F	Scheme plans	25
G	Contaminated sites and hazardous areas	28
H	Water permits	28
I	Check lists	29

Part 2: Development process

A. Preliminary

Developers should meet with the Council early on to ascertain any particular statutory or site requirements or limitations for the development proposed. This will let Council staff advise on whether resource consent is required, any other matters relating to the site, and identify any relevant capacity constraints within existing infrastructure.

Developers need to meet the district plan requirements, any proposed plan changes and other RMA provisions. The relevant requirements of the Council's Land Development Minimum Requirements must also be met.

Developers should be familiar with the Council's current strategy documents, all of which are subject to regular review. These include, but are not limited to:

- [Growth Strategy](#)
- [Open Space Strategy](#)
- [Sustainable Water Management Strategy](#)
- [Coastal Strategy](#)
- [Stormwater Management Strategy](#)
- [Sustainable Transport Strategy](#)
- [Infrastructure Strategy](#).

Applicants should ensure they are working with the most recent versions and cover relevant aspects of these strategies in their resource consent applications.

The principles and requirements set out in the various Council design guides should be applied in any design. The various guides are subject to review and applicants should ensure they are working with the most recent versions.

The Council has a design and review service available, where a range of staff can meet to work through design issues with developers. Although Council advice can be accessed at any stage, developers should engage as early as is practicable, ideally at the conceptual

stage, before lodging any resource consent application and/or final drafting of any complex engineering drawings. Developers will need to do their own due diligence to prepare for these meetings to ensure the most value is obtained from this service. Design and review discussions do not circumvent the RMA planning process, and decisions on notification or granting of consent cannot be made based on pre-application information.

(i) Greater Wellington Regional Council requirements

Applicants need to consider the requirements of the Greater Wellington Regional Council (Greater Wellington). These include:

1. The Regional Policy Statement for the Wellington Region.
2. The Proposed Natural Resources Plan for the Wellington Region which will replace the following five operative plans: Regional Fresh Water Plan, Regional Plan for Discharges to Land, Regional Soil Plan, Regional Coastal Plan and the Regional Air Quality Management Plan.
3. Public transport strategy from the Regional Land Transport Plan and Regional Public Transport Plan.

Greater Wellington will consider the Council to be an affected party on applications for resource consent if the ongoing discharge of stormwater enters an open channel or Greater Wellington's stormwater network, or the assets are intended to vest with Council. Developers should consult with Council before lodging a Greater Wellington consent.

The objectives and policies of the Wellington Regional Policy Statement provide a clear understanding of the approach Greater Wellington has to natural resource management in the region. Applicants should consult with Greater Wellington to seek its advice on the above plans and ascertain if resource consents are required. This is especially the case where large-scale earthworks (< 0.3 ha) and/or waterways are involved in the development.

(ii) Developer's responsibility to consult

Developers should consult mana whenua before lodging resource consent applications where historical and cultural values have significance to Māori. This is also a requirement of Council's criteria to assess land for new open space acquisition. Failure to consult may slow the processing of your application.

Consultation with other persons or organisations may be required, including:

- adjoining owners
- Department of Conservation
- environmental groups
- Toitū Te Whenua (Land Information New Zealand)
- Heritage New Zealand Pouhere Taonga
- network utility operators
- Waka Kotahi (New Zealand Transport Agency)
- other designating authorities (e.g. Fire and Emergency New Zealand)
- iwi
- other interested parties.

B. Concept plans

- (i) A concept plan (and a supporting design statement) is required where the proposal involves a large area or where alternative designs are proposed to be developed, particularly if to be staged over several years. Concept plans should look beyond the site to consider any contextual and strategic issues within the area, including urban form, landscape connectivity and cohesion.
- (ii) The concept plan and supporting information shall include sufficient details to give a general outline of the nature of the development, either as part of the plan or in the explanatory material accompanying the plan. Information supporting alternative design proposals should be sufficient to enable Council staff to assess the effectiveness of operation and analyse the proposal on a whole-of-life basis.
- (iii) The plan should provide an illustration of the proposal relative to its wider context and indicate approximate locations of:
 - roads
 - reserves

- waterways and flood plains
- Three Waters infrastructure
- stormwater infrastructure and secondary flow paths
- important natural features
- cultural sites
- hazards
- cycleways, walkways and bridleways
- proposed public amenities
- topography and landform
- other significant features.

The concept plan should also extend beyond the site to take account of any adjoining land able to be developed, or where other relevant contextual relationships exist, whether owned by the developer or not, and any effects on existing developed land.

Concept plans should be accompanied by a document identifying proposed ownership models, operational and maintenance requirements and costs, and life expectancy of assets (with whole-of-life costs compared against alternatives). The stormwater components of the concept plan should be supported by site investigations, hydraulic modelling and comprehensive engineering detail.

C. Resource consents

- (i) All developments must comply with the Council's Land Development Minimum Requirements document.
- (ii) Medium-density development within the urban areas may be a permitted activity and not require consent although still likely to require a building consent under the Building Act. Developers should contact the Council to discuss as some sites may be subject to other constraints.

- (iii) Subdivisions and other developments require resource consents in accordance with the RMA. In some cases, resource consents will be needed from both the Kāpiti Coast District Council and Greater Wellington. Developers must consult with the Council before lodging consents with Greater Wellington to ensure relevant requirements within the Council's Land Development Minimum Requirements can be met, and that any proposed solutions are approved for use in Council's network.
- (iv) Section 88 of the RMA and the Kāpiti Coast District Plan set out the information that must be included with any application to subdivide. [A resource consent checklist](#) is available which states the information required by the district plan. [A submission of engineering drawings checklist](#) is also available covering the requirements set out in this document.

Applications which do not have enough information will be returned as incomplete. Important parts of any application are the Assessment of Environmental Effects, reports covering specific aspects of the proposed development and plans for the development, being scheme plans for subdivisions and development plans for other developments. See below for requirements for these.

- (v) In addition to the RMA requirements, several national policy statements (NPS) and national environmental standards (NES) may be applicable to the proposed activity or development.

NPS provide national direction for matters of national significance relevant to sustainable management, and include:

- NPS Freshwater Management 2020
- NPS Urban Development 2020
- NPS Renewable Energy Generation 2011
- NPS Electricity Transmission 2008
- NZ Coastal Policy Statement 2010.

National environmental standards are regulations which prescribe technical standards, methods or requirement for land use and subdivision, use of the coastal marine area and beds of lakes and rivers, water take and use, and discharges or noise. The

standards can permit activities or development but also prohibit or require resource consents for activities to manage or protect the environment. NES include:

- NES for Plantation Forestry 2017
- NES for Air Quality 2004
- NES for Sources of Drinking Water 2007
- NES for Telecommunications Facilities 2016
- NES for Electricity Transmission Activities 2009
- NES for Assessing and Managing Contaminants in Soil to Protect Human Health 2011
- NES for Freshwater 2020
 - NES for Marine Aquaculture 2020
 - NES for Storing Tyres Outdoors 2021.

Every local authority and consent authority is responsible for enforcing these standards. The standards are available on the [Ministry for the Environment's website](#) or may be viewed at the Kāpiti Coast District Council office.

(vi) The application (particularly for subdivisions) should include:

- reports covering proposed land uses
- factors influencing the design of the development and design-led approach
- the extent of any earthworks proposed
- geotechnical report (if required) for foundation design and/or a soil report as evidence to support any proposal to dispose of sewage effluent on site
- stormwater disposal and treatment
- a transport assessment, including cycleways, walkways and bridleways provision
- wastewater provisions

- potable and fire-fighting water supply provisions
 - road safety audits (where required)
 - current and future effects of traffic
 - natural hazards and mitigation of these
 - contaminated sites
 - details of the design, layout and number of any off-street parking that may be proposed
 - access for fire-fighting appliances
 - provision of network utility services
 - mitigation of natural hazards
 - identification of ecological values
 - response to Council's assessment criteria for open landscape and urban design framework
 - any other relevant information which may help the Council make an informed assessment of the proposals.
- (vii) Where non-standard/innovative designs are proposed, the applicant shall provide sufficient information to enable Council staff to assess the viability of the proposal, ongoing maintenance requirements and whole-of-life cost assessments.
- (viii) If a subdivision is likely to fall within the provisions of Section 106 of the RMA, then the Council may refuse to grant subdivision consent, or may grant subdivision consent subject to conditions. In cases where Section 106 provisions may apply, applicants should propose suitable conditions for the purpose of avoiding, remedying or mitigating the effects referred to in RMA subsection (1) of Section 106.
- (ix) An applicant is required to assess how prone any proposed development is to flooding through direct liaison with the authority responsible for administering the area's watercourses. If the Greater Wellington or the Kāpiti Coast District Council do not have the necessary information, then the applicant will be responsible for providing it.

Applications should include proposals for dealing with stormwater from the development, including, where necessary, assessing the effects of the proposed development on upstream and downstream stormwater flows and levels.

The effects of climate change shall be included in the assessment.

The assessment should also include possible effects the proposed development may have on groundwater levels and the possible impact of groundwater on the proposed development. It should identify any measures proposed to mitigate any adverse effects arising from possible changes in groundwater levels, including those resulting from the development itself and those projected because of climate change.

Stormwater runoff from the development shall discharge into the existing stormwater systems without adverse impacts on other properties either upstream or downstream of the development site.

Potential increases in stormwater runoff peak flows and volumes shall be mitigated within the development by appropriate measures. Examples of such measures include on-site storage and soakage where soil types and groundwater levels enable this.

Secondary flow paths required to deal with runoff from the 100-year design storm (1 percent annual exceedance probability event) should be identified. If secondary flow paths are not available, then the stormwater systems shall be designed to meet the flows arising from the 100-year design storm.

Generally, secondary flow paths shall be located within publicly-owned land, such as roads and reserves. In the unlikely event the Council approves secondary flow paths through private property, it will require easements or covenants to be recorded on the title.

To meet the requirements of Section 106 of the RMA, the Council needs to consider in any subdivision application the implications of flooding or inundation and any coastal hazards. Building sites within subdivisions are required to be above the flood level of the 1 percent annual exceedance probability (AEP) storm event plus an approved freeboard.

A distinction is made between inundation by ponding and inundation where flood waters are likely to generate scour velocities and consequent erosion. Applicants must either establish the land is not subject to significant damage or propose measures that will ensure that significant damage under 'bank full' conditions does not occur or can be remedied.

Areas of private property may be able to become inundated (usually not exceeding 300mm) provided they are not used as building sites. These areas shall be designed to a 1 percent AEP storm event and may be registered as building exclusion zones on the titles of the properties. Council will not give approval where it considers erosion is likely to occur. However, it should be noted that a property that experiences periodic inundation may be subject to an assessment under Section 71–73 of the Building Act. This process can result in a notice being placed on the title that can have insurance implications.

Raising the dwelling on piles will only be considered when the recommended build level is less than 300mm above ground level, and if the application is supported by a comprehensive risk assessment. This will be accepted or otherwise at Council's discretion.

Roads may be inundated up to 200mm in the 1 percent AEP storm event. Exceeding this threshold will trigger the need for a risk assessment using hydraulic modelling.

A report from an independently qualified person should be included with the resource consent application that covers stormwater disposal (and potentially treatment, if applicable) and inundation issues (including a catchment plan and calculations, site investigations, hydraulic modelling and comprehensive engineering details). This report should also include possible effects arising from climate change. Council may require additional hydraulic modelling and/or peer review at an applicant's cost.

(x) After your application is received

Council may, within 10 working days after an application is first lodged, decide the application is incomplete.

(i) Notified applications

Once an application is accepted, the Council will decide whether it should be publicly notified, limited notified or non-notified. In making this decision, the Council will consider the requirements of the rules in the district plan and any relevant national environmental standard. If notification is an option, then Council will consider the scale of the effects of the development and the impacts of these effects on any affected parties.

If an application is to be publicly notified, it will be advertised in the public notices section of an appropriate local newspaper. Interested parties are invited to inspect the

application at the Council buildings or their local library and make a submission either for or against the proposal. The aim of notification is to ensure everyone that may be affected by a proposal is given the opportunity to make a submission.

If it is to be limited notified, then a notice is served to only those parties who are considered to be directly affected by the application (such as immediate neighbours). Affected parties will be invited to participate in the submission and hearing process directly.

(ii) Pre-hearing meeting

Once the closing date for submissions has passed, the Council may arrange a pre-hearing meeting. The applicant and all submitters are invited to discuss the application in an informal way. The aim is to first clarify the concerns and goals of all parties, and to agree on the facts as far as possible.

Secondly, the pre-hearing meeting can go on to resolve as many differences as possible. If all differences are resolved a hearing may not be necessary. If some concerns remain unresolved, then the application will go to hearing. A hearings panel or independent commissioner will hear the application and decide to grant (subject to conditions) or refuse consent. This decision may be appealed to the Environment Court. Further information is available from the Council.

(iii) Non-notified applications

If an application is non-notified, resource consent planners will make the decision to grant or refuse consent under delegated authority. Applicants can object to the Council if consent is refused, or if they are not happy with the conditions of consent.

The Council may forward draft conditions to applicants and consider any comments they may have before issuing the resource consent. Any comments must be received within 24 hours of providing the draft conditions. The Council will not 'debate' the conditions with applicants. If applicants are not satisfied with conditions, they can use the objection provisions of the RMA.

Consents may have conditions imposed to:

- ensure developments are sound in relation to both engineering and environmental aspects
- protect other landowners and future residents.

Council's resource consent planners and the subdivision engineers will set the conditions using the district plan and other planning and engineering documents (including this document) as guidance. Applicants may appeal or object to any conditions set on their consent.

Further information regarding appeals can be obtained from the Council.

(xi) Submitting a survey plan

Once resource consent for subdivision has been granted, there is usually a period of five years to submit a survey plan for the Council's approval. This plan must be in accordance with the original plan and any conditions of approval. If the survey plan satisfies the Council's requirements, approval is granted electronically. The survey plan is then lodged with Toitū Te Whenua Land Information New Zealand.

A longer period for the survey plan to be submitted may be agreed by the Council at the time consent is granted, and an extension can be granted later by the Council if certain criteria are met.

A certificate stating that all the conditions of consent have been satisfied must be provided within three years of the Council's approval of the survey plan. This certificate and other documents are then lodged with the Registrar General of Lands to allow the new certificates of title to be issued. Failure to gain this certificate within the time limit may result in the consent approval lapsing.

(xii) Resource consent fees

The Council imposes fees for the processing of resource consent applications and for the ongoing monitoring of resource consent conditions.

Fees are split into two components:

1. an application fee is required for the consent planning processes, decisions on applications
2. an application fee is required for the engineering considerations required, where applicable.

Where consent monitoring is involved, additional fees may be required. The quantum of these will generally be included in the resource consent conditions. Additional charges and costs are required to be fair and reasonable.

Schedules of the fees and charges are available from the Council.

D. Development impact fees

Financial and development contributions may be required for developments and subdivisions in accordance with the requirements of Council's district plan and development contributions policy. The most current information on development impact fees can be found [on the Council's website](#).

(i) Financial contributions

[Financial contributions](#) can be used to mitigate the effects of developments on natural and physical resources of the district in accordance with provisions of the RMA.

(ii) Development contributions

Development contributions shall be required from new developments in the form of money or land, or both, at the Council's discretion. This includes infrastructure such as roading, cycling, walking and bridleways (CWB), water supply and wastewater treatment facilities, community infrastructure, and flood mitigation activities, in accordance with the Council's development contributions policy. These fees are adjusted from time to time, usually annually. The quanta of fees payable are those that apply at the date of application.

The current schedule of financial and development contributions can be found on the Council's website.

E. Assessment of environmental effects

- (i) For all resource consent applications, it is necessary to provide an assessment of any actual or potential effects that may result from the activity for which the consent is sought. Applicants need to prepare an assessment of environmental effects in accordance with the Fourth Schedule to the RMA. The Council holds a series of [checklists and guides](#) which includes assessments of environmental effects reports.
- (ii) An assessment of environmental effects may include:
 - such issues related to traffic and transport across all modes (including active modes and freight) and considering the full range of needs and abilities of all people

- effects upon urban design, landscape and ecological values
 - effects arising from stormwater (quality and quantity)
 - wastewater and provision of potable water supply
 - effects of additional buildings on amenity values.
- (iii) The amount of detail in an assessment of environmental effects should be in proportion to the scale of the potential or actual effects of the activity, including cumulative effects.
- (iv) The Fourth Schedule to the RMA requires details of who is affected, any consultation undertaken with the parties (including tangata whenua), the results of this consultation and the views of those consulted. It is best to consult early when preparing an application. Effective consultation can resolve any misunderstandings and concerns that affected parties may have. This, in turn, can result in the application being simpler and quicker to process. If the applicant does not undertake adequate consultation, this will be done by the Council at the applicant's cost.
- (v) If an assessment of environmental effects is not completed or does not have sufficient information for Council consent staff to make a decision, either the application could be rejected outright, or a request will be made for further information. The applicant has the right to formally object to a request for further information. Advice on this is available from the Council.

F. Scheme plans

- (i) Scheme plans for subdivision or land development shall comply with those requirements of the district plan (to the extent applicable) that apply to the land being subdivided or developed. Any failure to meet the district plan rules will result in a need to apply for a resource consent, with scheme plans being submitted as part of the resource consent application. It should be noted that subdivision is not a permitted activity and hence consent will always be required for a subdivision.
- (ii) Scheme plans shall provide the information sought in the Council's [subdivision application kit](#). The following information shall be provided:
- a. The position of all existing public utility services and water courses, water catchments and other significant water features in the vicinity.

- b. Adequate contour information to illustrate the existence on each allotment of a suitable building platform and to enable the gradients proposed for roads, rights of way and access ways to be assessed. For two- or three-lot subdivisions, spot levels in terms of mean sea-level datum for Wellington (or, if requested, New Zealand Vertical Datum 2016) may be acceptable where the contour of the land is gentle enough to enable road and right-of-way grades and feasibility to be assessed from such limited information.
- c. Sufficient topographical information including a locality plan, if necessary, to accurately identify the site. The position of all buildings and significant stands of trees or bush and any other significant feature of historic, cultural, environmental or other interest shall be shown.
- d. Where a scheme plan forms only part of the future potential development of a larger block of land held in the same ownership and zoned residential, and where a concept plan has not previously been provided, the scheme plan shall show the total development including roading, drainage, water supply and the number of allotments. This is to ensure the initial scheme plan application does not prejudice full and future development. The extended development may be shown to a smaller scale as an insert on the initial application.
- e. All allotments on the plan shall be numbered, including any land to vest, and shall show metric dimensions for all boundaries as well as the area of each allotment.
- f. Ensure adequate space is provided for the disposal and treatment of stormwater. Greater Wellington will consider Council to be an affected party on applications for resource consent if the ongoing discharge of stormwater enters an open channel or its stormwater network, or the assets are intended to vest with Council. Developers should consult with Council before lodging a Greater Wellington consent to ensure the solution is acceptable.
- g. Indicative roading networks and service layouts shall be shown with typical road cross-sections which provide enough information to check that adequate gradients and suitable pipe cover can be achieved.
- h. The conceptual cycleway, walkway and bridleway indicative network.

- i. Landscape plans and schedules showing all landscape works proposed, including for all open space, road reserve and low (environmental) impact urban drainage design structures.
 - j. Details of any proposed reserve and its proposed development. The applicant is responsible for nominating the purpose for which each reserve is to vest and this information shall be shown on the plan. The applicant is also responsible for providing an assessment against the acquisition criteria in Council's Open Space Strategy. The Council may or may not approve part or any of the proposals.
 - k. Public roads, private ways, service lanes, access ways and cycleway, walkway and bridleway networks shall be laid out to fit in with the general roading requirements of the locality in which they are situated. They shall provide for connectivity within the proposed development and, where applicable, to adjoining land, and meet any requirements arising from road safety audits.
 - l. The width of legal road reserves and carriageways and road geometry and gradients shall be in accordance with Table 3.2, Road Design Standards, in NZS 4404:2010, unless the Council has approved or required alternative designs.
 - m. Plans shall be drawn to commonly accepted metric scales. The Council's preference is for scales of either 1:500 or 1:1000. However, scales of 1:100 or 1:200 are acceptable in appropriate situations. Datum shall have reference to mean sea level (Wellington) or, if requested, New Zealand Vertical Datum 2016. A north point must be shown on plans.
- (iii) Due regard shall be given for any road widening or upgrading proposals which the Council may have, and any requirements shall be ascertained by consultation at an early stage with appropriate Council staff.
 - (iv) In designing any scheme plan, consideration shall be given to the future development of adjoining land and the Council may require the creation of legal road, road reserve and/or the formation of roads to or near the boundary of adjoining land at the developer's cost.

In submitting any scheme plan for approval, the applicant shall provide documentary evidence the general layout is sufficient for reticulation by other utility service authorities and meets Fire and Emergency New Zealand requirements.

When a scheme plan has been approved, adequate provision shall be made for transformer sites, junction boxes and other special needs of these authorities.

G. Contaminated sites and hazardous areas

- (i) Where there is the possibility of a site containing contaminated materials, including from agriculture use, then the applicant shall have appropriate site investigations undertaken by an independently qualified person. A report by the independently qualified person shall be included with the resource consent application outlining the findings of the investigation with recommendations on how to deal with the contaminants. Resource consent may be required under national environmental standards for subdivision, change of land use, soil disturbance or removing/replacing a fuel storage system.
- (ii) Where the site is subjected to hazards including, but not limited to flooding, coastal erosion, earthquake fault lines, liquefaction and land slips, then the applicant shall have appropriate investigations undertaken by an independently qualified person. A report by the independently qualified person shall be provided with the resource consent application outlining the extent of the hazard and recommendations on how to deal with the hazards identified. Section 106 of the RMA may apply to the hazardous situation.
- (iii) Applications must identify climate change impacts on the site and how these will be mitigated.

H. Water permits and water quality

- (i) The applicant shall thoroughly evaluate the effects which the proposed works are likely to have on surface runoff and the consequences of this, both on the land to be developed and any adjoining lands, and into water.
- (ii) The applicant must consider the impact of the development on Te Mana o te Wai. This concept is part of the NPS Freshwater Management 2020 and refers to the vital importance of water. When managing freshwater, it ensures the health and wellbeing

of the water is protected and human health needs are provided for before enabling other uses of water.

- (iii) Water permits shall be obtained from Greater Wellington for any restricted activity covered by Section 14 of the RMA and any requirements arising from the proposed Natural Resources Plan, the Regional Fresh Water Plan and Regional Discharges to Land Plan.
- (iv) Greater Wellington's approval shall be obtained for temporary or emergency overflows from sewage pumping stations to comply with the requirements of Section 15 of the RMA's discharge of contaminants into the environment.
- (v) A water permit may be granted on either a temporary or permanent basis. A permanent permit is required if the obstruction, impounding, diversion or discharge of water, whatever the case may be, is to become a permanent part of the development.
- (vi) Any condition imposed by Greater Wellington or the Council shall be deemed to be a condition of scheme plan approval for the subdivision or development.
- (vii) Where a water permit requires the Council to assume responsibility for any of the temporary works which will remain in operation after the Land Transfer Plan is deposited, the Council will require the applicant to enter into a registrable agreement enabling it to recover any costs arising from the operation of such temporary works.
- (viii) The applicant shall be responsible for the payment of all fees to Greater Wellington for the licensing of the permits to discharge stormwater.
- (ix) Greater Wellington considers Council to be an affected party on applications for resource consent if the ongoing discharge of stormwater enters an open channel or its stormwater network, or the assets are intended to vest with Council. Developers should consult with Council before lodging a regional council consent or confirming a solution with Greater Wellington.

I. Checklists

Checklists covering the requirements in this document have been developed.

The applicant shall provide completed check lists for the following:

- (i) [Resource consent application](#)
- (ii) [Submission of engineering drawings](#)
- (iii) [Submission of as-built drawings](#)
- (iv) [Request for Section 224 certificates.](#)

Contents: Part 3 Development requirements

A.	Development approaches	33
B.	General provisions	34
	(i) General requirements	34
	(ii) Developer’s professional advisors	34
	(iii) Independent qualified persons	35
	(iv) Peer reviews	35
	(v) Specific design certification	36
	(vi) Maintenance of standards	36
	(vii) Quality assurance plan	36
	(viii) Safety	37
	(ix) Engineering services	38
	(x) Natural ecosystems	39
	(xi) Working in existing roads	41
	(xii) Design performance criteria	41
	(xiii) Design report	42
	(xiv) Commuted sums	43
	(xv) Development agreements (LGA s207)	43
	(xvi) Vesting of infrastructure as public assets	44
	(xvii) Approval for connection to Council network	44
C.	Earthworks and geotechnical	45
	(i) General requirements	45
	(ii) Geotechnical appraisal and design	45
	(iii) Performance criteria	45
	(iv) Iwi representation	46
	(v) Cultural sites	46
	(vi) Archaeological sites	46
	(vii) Erosion and sediment control	47
	(viii) District plan provisions	47
D.	Transportation	47
	(i) Sustainable Transport Strategy	47
	(ii) Network hierarchy	49
	(iii) Performance criteria	50
	(iv) Design principles	51
	(v) Design and access statement	52
	(vi) Road safety audits	53
	(vii) Means of compliance	54
E.	Stormwater	54
	(i) Stormwater strategy	54
	(ii) Stormwater objective	55
	(iii) Stormwater management	55
	(iv) Reserves credit	56
	(v) Performance criteria	56
	(vi) Design principles	57

(vii)	Design requirements	60
(viii)	Greater Wellington Regional Council requirements	62
(ix)	Stormwater quality	62
(x)	Low-impact design references	63
(xi)	Relevant information	63
(xii)	Design methods	63
(xiii)	Construction	64
(xiv)	Building Act 2004	64
F.	Wastewater	65
(i)	Objective	65
(ii)	Performance criteria	65
(iii)	Greater Wellington requirements	66
(iv)	Design principles	66
(v)	Private and public drains	67
(vi)	Alternative wastewater systems	68
(vii)	Pumping mains and pump stations	72
(viii)	Construction	72
(ix)	Approved contractors	72
G.	Water supply	73
(i)	Water supply management	73
(ii)	Performance criteria	73
(iii)	Design principles	74
(iv)	Relevant information	75
(v)	Pumping station and reservoirs	75
(vi)	Construction	76
(vii)	Approved contractors	76
H.	Landscape	77
(i)	General requirements	77
(ii)	Protection of vegetation	77
(iii)	Reserves	78
(iv)	Design and implementation	79
I.	Network utility services	80
(i)	General requirements	80
(ii)	Design and construction	81
J.	Waste services	84
(i)	General requirements	84
(ii)	Design requirements	84

Part 3: Development requirements

A. Development approaches

- (i) The Council has adopted a development approach that allows variations in the way compliance with district plan requirements can be achieved. It seeks to have 'best practice' implemented in developments within the district. Towards this end, the Council has developed a series of guides that with principles to be applied in developments within the district.

The design guides

The design guides include, but are not limited to:

- [Best Practice Subdivision and Development Guide](#)
- [Rural Subdivision Design Guide](#)
- [Streetscape Strategy and Guidelines](#)
- [Low Impact Urban Design and Development Stormwater Guidelines](#)
- [Kāpiti Coast Rainwater and Greywater Code of Practice](#)
- [The Standards New Zealand Handbook, SNZHB 44:2001 Subdivision for People and the Environment](#)
- [Crime Prevention through Environmental Design \(CPTED\) Guides](#)
- [Growing Native Plants in Kāpiti](#)

Applicants can also submit to the Council alternative designs based on appropriate design guides and with appropriate supporting detail.

- (ii) Sections B to I of Part 3 set the development and minimum engineering requirements for developments within the district.
- (iii) The Council has adopted the New Zealand Standard NZS 4404:2010 as the baseline document to meet its minimum engineering requirements. Schedules outlining the Council requirements that are different to, or not covered in the Standard, have been developed and form part of the minimum engineering requirements. Any proposed

infrastructure must be fit for purpose for all intended uses and hence higher standards may be required over and above these minimum standards.

- (iv) Developments need to encapsulate the principles in the Council's design guides and, as a baseline, meet the minimum engineering requirements. Infrastructure must be fit for purpose for all practical uses. Developers can offer alternative engineering designs with appropriate supporting information.

B. General provisions

(i) General requirements

Developments shall comply with this Section B and Section 1, General Requirements and Procedures of NZS 4404:2010, except as modified by the schedule titled Schedule 1, Kāpiti Coast District Council Altered Requirements to Section 1 NZS 4404:2010, General Requirements and Procedures.

If there is any conflict between the requirements in this Section and NZS 4404:2010 then the requirements in this Section take precedence.

(ii) Developer's professional advisors

The owners of any development projects shall appoint a developer's or owner's representative or representatives who shall be the developer's professional advisor or advisors. They shall be responsible for the investigation, design and obtaining of approvals of the works, contract administration and supervision of the works, and certification upon completion of the works. The developer's professional advisor shall be a person with qualifications and/or experience appropriate to the project, with suitable liability and indemnity cover commensurate with the development's scale but not less than \$1,000,000. All civil engineering works must be designed, supervised and certified by a qualified civil engineer with experience to a level to permit membership to the relevant professional body or person under their direct control.

The developer's representative should be agreed between the Council and applicant before engagement. The Council requires evidence that appropriate liability and indemnity cover is held.

(iii) Independent qualified persons

Where investigations and reports are required by an independent qualified person, a person or company should be agreed between the Council and applicant **before** the engagement. The person or company will normally be expected to be professionally recognised in the area of competence claimed, and to carry professional indemnity insurance to a level suitable for the purpose but, in any case, not less than \$1,000,000. The Council requires evidence that appropriate liability and indemnity cover is held.

The Council may keep a register of approved independent qualified persons and their associated areas of expertise. In general, it can be considered that Council will be satisfied with the use of such persons provided they are undertaking work in their area of expertise.

Without limiting the Council's rights to require the use of independent qualified persons, the following are examples of areas of expertise where such people may be required:

- (a) traffic engineering
- (b) flood mitigation and assessment of effects of development on flood/runoff issues
- (c) suitability of land for on-site wastewater disposal
- (d) suitability of rural water supply proposed by the applicant
- (e) geotechnical engineering before development and to manage fill and excavation compliance during construction, slope stability and seismic resilience
- (f) site investigations and recommendations for foundation design
- (g) ecology reports and recommendations
- (h) civil engineering works.

(iv) Peer reviews

The Council reserves the right to have any work peer reviewed regardless of any prior approval as to the acceptability of the independent qualified person. Generally, peer reviews will review underlying assumptions, methodology, interpretation of data and that the conclusions reached are supported by the data and analysis. It is not expected that peer reviews are a repetition of the investigation and analysis.

Peer reviews will generally be requested where the Council believes there is a higher than usual risk element to the proposal, or where the applicant is proposing something outside of these requirements.

The peer reviewer shall provide a completed Peer Review Certificate using the ACENZ/ENZ PS2 form.

(v) Specific design certification

Where an independent qualified person has recommended a specific design, and a design has been prepared in accordance with that recommendation, then the Council requires certification by that independent qualified person that the works have been completed in accordance with the design principles recommended.

(vi) Maintenance of standards

Developers have the responsibility, both directly and through their appointed representatives, to ensure all works carried out directly, or by contractors or sub-contractors, are always in accordance with the approved drawings and specifications (including approved variations), and sound engineering practice. While Council staff will be available to offer advice and guidance, it remains the responsibility of the developer's professional advisor to supervise the construction and ensure standards are maintained.

The level of construction monitoring required to verify the works have been completed in accordance with the approved plans and specifications depends on what is deemed appropriate for a particular project. To determine the appropriate level of supervision required for a project, refer to the [Construction Monitoring Services/Guide section](#) on the Engineering New Zealand website.

In particular, the maintenance and defects liability period requirements should be noted.

(vii) Quality assurance plan

A quality assurance plan that is specific to the project and that describes how the work will be managed and administered in compliance with Council's standards and requirements shall be provided.

The plan's comprehensiveness should be in proportion to the scale of the project and be seen as part of the process of ensuring compliance with the conditions of the resource consent or project brief. The plan allows key project milestones to be identified early on in the process so that nothing is missed.

The plan shall include, or otherwise reference, the procedures and checklists necessary to effectively manage the work. At a minimum, the following should be included:

- (a) a statement describing the activity, including the proposed timeframe
- (b) a schedule of the contractual and materials quality records to be kept
- (c) a list of subcontractors
- (d) health and safety documentation for all contractors and subcontractors, including contractor's health and safety plan, approved contractor's letter and completed contractor's health and safety obligation form (where appropriate)
- (e) procedures for auditing contractor and subcontractor compliance to the quality plan
- (f) a schedule of inspection and/or testing of materials and/or completed works, clearly indicating 'hold' or 'witness' points (the level of supervision required shall be appropriate for the project's complexity and/or scale and reference the [Construction Monitoring Services/Guide section](#) on the Engineering New Zealand website)
- (g) documented procedures included, or referenced, for all activities
- (h) non-conformance and quality improvement procedures included or referenced
- (i) provisions for traffic management and environmental management plans included or referenced
- (j) road safety audits (if required).

The developer's or owner's representative shall submit the quality assurance plan for approval with the engineering drawings.

(viii) Safety

Developers, developer's professional advisors and contractors must meet the requirements of the Health and Safety at Work Act 2015. Developers and/or contractors working on a development site are responsible for the safety of Council employees and anyone else undertaking work on, or inspections of, the development.

Developers and their representatives shall ensure contractors have in place effective safety management systems and suitable plans to carry out the required work in a

safe manner. They will also ensure contractors comply with the requirements of relevant legislation covering the works.

Where a developer's contractor is to make connections to Council-owned existing services or roads, the developer, the developer's professional advisor and the contractor shall comply with the Council's Health and Safety Management System. For the purposes of the health and safety requirements, any work on Council-owned assets is deemed to be managed by the developer's professional advisor on behalf of the Council. The developer's professional advisor shall obtain the contractor's health and safety documents as set out in the Council's Health and Safety Policy – Contractor Management. These documents can be obtained from the Council's Health and Safety Advisor who will also issue an approved contractor's letter if all paperwork meets the Council's health and safety obligations, before work begins.

If the contractor already is an approved contractor (the approval letter is current for two years) then only a health and safety plan and obligation form need to be signed.

The developer's professional advisor shall ensure they carry out regular reviews to ensure that all processes are being carried out as stated in the health and safety plan. A review shall be completed at the end of the project.

(ix) Engineering services

Engineering services required for a development shall be provided and be in accordance with Council requirements, or as otherwise approved by the Council. Engineering works will generally include the provision of:

Urban developments

- Earthworks
- Stormwater management, including all stormwater systems
- Wastewater
- Water supply, including for firefighting purposes
- Underground power, gas and telecommunication services
- Street lighting
- Kerbs and/or channels where appropriate

Land Development Minimum Requirements

- Road formation, metalling and sealing
- Footpaths as required
- Cycleways, walkways and bridleways
- Formation, metalling, sealing, drainage, kerbs and/or channels (where appropriate) and provision of services for private rights-of-way and service lanes
- Paths and fencing (where appropriate) in public access ways, cycleways, walkways and bridleways
- Grass areas, planting and other landscaping within road reserve or recreational and drainage reserves to vest.

Rural developments

- Earthworks
- Road surface water drainage and culvert installations
- Wastewater treatment and disposal
- On-site water supply or restricted water supply reticulation if a public system is available, including for firefighting services
- Electric power and telecommunication services
- Street lighting, if appropriate
- Formed, metalled and sealed road pavement, safety shoulders and drainage channels
- Formed, topsoiled and sown road berms
- Cycleways, walkways and bridleways where appropriate.

(x) Natural ecosystems

Developments must contribute to the requirements of the NPS Freshwater and any national policy statement on biodiversity. Developers shall ensure natural ecosystems can continue to function and are not degraded or lost as a result of the subdivision or

development. Systems that enhance existing natural ecosystems and water quality should be prioritised.

As a minimum, developers are required to:

- (a) Provide information about any natural values (including indigenous fauna) that occur within the development site or that will be affected by the development site (i.e. can be off site as well).
- (b) Submit to the Council a plan detailing how any natural values will be protected and enhanced, and appropriate conditions or methods to achieve this. The natural values/ecosystem assessment and plan will:
 - Identify all natural values that will be affected and detail appropriate mitigation. Note that Greater Wellington's Proposed Natural Resources Plan provides schedules of areas of natural value that can be used as a guide. Cultural assessment may be required for sites that are significant to mana whenua.
 - Demonstrate that the impact of buildings, structures, people, domestic animals and increased use of the area and adjacent areas in relation to the impacts on indigenous vegetation communities, landforms (e.g. dunes) and indigenous fauna are effectively avoided, remedied or mitigated.
 - Demonstrate that indigenous vegetation communities are not degraded by the introduction of weeds from gardens by either using indigenous species or prohibiting the use of species that would become weeds in the environment in question.
 - Demonstrate that the likely impacts of increased disturbance or predation are properly assessed and measures are put in place which protect indigenous fauna and flora.

Design requirements may include:

- Protection of areas of indigenous vegetation through legal protection, fencing and pest and weed control (see also Reserves section).
- Restoration plans for areas of ecological value.
- No-build areas or planted buffer areas to ensure 'edge effects' and conflicts in use are not caused by building too close to natural areas (including watercourses).

- Conditions placed on the consent that list plants which should not be planted in the subdivision as a way to control the spread of weeds.
- Interpretation content to help residents and the public understand the values of a site and direct how they should be protected.
- Pest plant and animal control.
- The exclusion of domestic predators, such as cats and dogs, from the development to protect the values in adjoining areas. This is important for subdivisions adjacent to coastal areas, wetlands and forest tracts, especially where there is no significant existing development in or next to the area.
- The exclusion of goats as they may not be appropriate to keep next to forested areas or where adjoining the forest park, as goats are hard to contain. Escaped goats can lead to wild populations being established in the forest park.

(xi) Working in existing roads

Rules related to working on or connecting to existing roads can be found [on the Council's website](#).

The code is available on the [New Zealand Utilities Advisory Group's website](#). The Council's local conditions document is available from Council.

The Council may require the arrangement of bonds to cover work being undertaken within existing roads. The amount of the bond shall be Council's estimate of the value of the works undertaken in road reserve and held to cover the costs incurred by the Council in the event of default or prolonged opening. The bond shall be released upon Council being satisfied with the practical completion of the corridor access works.

(xii) Design performance criteria

The purpose of an engineering design is to provide a common term of reference for defining the physical works (as may be required to meet Council requirements and/or resource consent conditions) and to provide a way to evaluate the proposed works against their performance requirements.

An engineering design shall:

- (a) define the scope of the works and incorporate all of the components required for the intended project
- (c) be legible and understandable and supported by sufficient drawings, calculations, reports and associated documentation to facilitate appraisal
- (d) provide sufficient information for construction purposes
- (e) provide for:
 - safety
 - the whole of the catchment
 - safety in design
 - sudden or catastrophic failure
 - future development
 - efficiency in operation and maintenance
 - optimisation of life-cycle costs
- (f) be prepared and endorsed by independent qualified persons
- (g) demonstrate compliance with resource consent conditions, this document and other regulatory and statutory requirements
- (h) be a platform for approvals and acceptance.

(xiii) Design report

The Council may require the submission of a design report which will describe how the designer has:

- (a) identified and addressed the design, management, administrative and legislative requirements specific to the design
- (b) planned the work to satisfy those requirements
- (c) managed communication with stakeholders and other parties to the design

- (d) reviewed/tested the design to ensure compliance with the quality requirements
- (e) recorded design activities and maintained records and evidence of compliance
- (f) provided a design certificate in the form of the certification in Schedule 1A.

(xiv) Commuted sums

In some situations, the Council will require the developer to pay a commuted sum based on the net present value of the ongoing operation, maintenance and replacement costs for a facility taken over by the Council. This particularly relates to sewer pumping stations but may also apply to other non-standard situations. If it applies, applicants should discuss this with the Council at an early stage.

(xv) Development agreements (LGA s207)

Development agreements can provide a potential opportunity for improved outcomes for both the developer and the Council. They can help the Council fund an identified capital programme earlier than planned or, in some cases, offer better ways of providing the infrastructure related to growth, especially when a developer is intending to carry out large-scale works themselves as part of a development.

Development agreements can be initiated by a written request from the developer and/or initiated by the Council. Council will consider entering into a development agreement if the agreement:

- (a) benefits the Council as well as the developer
- (b) clearly quantifies the public benefit it is proposing to provide
- (c) does not seek to subsidise the base level of infrastructure servicing required to support the development
- (d) is not retrospective
- (e) does not seek to mitigate commercial risks faced by the developer
- (f) does not seek to facilitate development to the detriment of other values considered important on the site in question (e.g. ecological or historical)
- (g) does not undermine future consenting processes

(h) is required for the development.

(xvi) Vesting of infrastructure as public assets

Council will consider all requests for vesting of infrastructure in Council. Council will require roads to meet its requirements and/or standards before vesting. Upgrading works may be required where developers decide they want to vest after consents have been issued or after a development has been constructed.

The following assessment criteria will be used:

- (a) the degree of public good delivered by the asset
- (b) the contribution of the asset to the efficiency of the wider Council network
- (c) the consequences of asset failure on the wider Council network
- (d) strategic fit
- (e) operational, maintenance and replacement costs
- (f) quality of design and construction and compliance with the requirements set out in this document.

(xvii) Approval for connection to Council network

All infrastructure that connects to the Council network must be approved by Council. This approval must be applied for before connection on the correct application form.

Where connected assets are to remain in private ownership, the developer will provide a legal instrument that identifies responsibilities for operation, maintenance and replacement of the asset over its working life.

C. Earthworks and geotechnical

(i) General requirements

Developments shall comply with this Section C and Section 2, Earthworks and Geotechnical Requirements of NZS 4404:2010, except as modified by the schedule titled *Schedule 2, Kāpiti Coast District Council Altered Requirements to Section 2 NZS 4404:2010, Earthworks and Geotechnical Requirements*.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

(ii) Geotechnical appraisal and design

Geotechnical appraisal and design may be required:

- (a) before detailed planning, which usually involves some form of subsurface investigation
- (b) during the review of design concepts
- (c) during construction to ensure the adequacy of bulk filling and the execution of the earthworks design
- (d) after construction to provide certification and/or define limitations of the works.

(iii) Performance criteria

Earthworks shall:

- (a) meet the relevant standards and criteria of the district plan
- (b) be safe, stable and geotechnically sound
- (c) not unnecessarily alter the natural landform or interfere with natural features
- (d) provide appropriate protection to existing vegetation during the development period, especially where earthworks are occurring in proximity to ecological sites
- (e) avoid, remedy or mitigate the potential risk posed by seismic activity i.e. liquefaction, lateral spreading or fault rupture

- (f) provide adequate foundations for roads and services
- (g) provide an accessible building area within each lot of a subdivision appropriate to the zoning of the land (This does not necessarily mean that the area has to be 'flat'.)
- (h) control surface and groundwater flows both during and after construction
- (i) control sediment generated by the works
- (j) not cause undue nuisance from silt, dust, noise or disposal of vegetation.

(iv) Iwi representation

Where the scope of earthworks is outside the district plan permitted activity standards or is to be undertaken in areas of cultural significance, a representative of the relevant local iwi may be required to be on site while earthworks are being undertaken.

The process of iwi involvement is in two stages. First, all applications for resource consent are discussed with relevant iwi where they get an opportunity to raise any cultural concerns. Second, if deemed necessary, an iwi representative will be required to be on site during earthworks as a condition of consent.

(v) Cultural sites

Should a waahi tapu or other cultural site be unearthed during earthworks the contractor and/or owner shall:

- (a) cease operations
- (b) inform local iwi (Ngāti Raukawa ki te Tonga, Āti Awa ki Whakarongotai, Ngāti Toa Rangatira or Ngāti Haumia)
- (c) inform the Heritage New Zealand Pouhere Taonga and apply for an appropriate authority if required
- (d) take appropriate action to remedy damage and/or restore the site after discussion with Heritage New Zealand Pouhere Taonga, the Council and iwi.

(vi) Archaeological sites

Where an archaeological site is present (or uncovered during earthworks) an authority from Heritage New Zealand Pouhere Taonga is required, in accordance with the Heritage New Zealand Pouhere Taonga Act 2014.

Where earthworks are proposed, it is recommended this authority be obtained before work on the site starts.

(vii) Erosion and sediment control

Controlling erosion and sediment during the course of the work is extremely important. Developers are responsible for ensuring all practical measures are taken to control erosion and sediment in line with best practice and any specific conditions on any resource consent. Developers shall ensure existing infrastructure is protected, particularly in staged or infill developments, where work is occurring next to that existing infrastructure.

Resource consent from Greater Wellington is required for bulk earthworks over 0.3ha (3,000 m²).

(viii) District plan provisions

The district plan contains various provisions for preserving vegetation and/or landform. Developers shall comply with those provisions and should note this may have an impact on the extent of earthworks that may be permitted. These rules include that: earthworks cannot be undertaken on a slope of 28 degrees or more or within 20m of a waterbody.

D. Transportation

(i) Sustainable Transport Strategy

The Council's [Sustainable Transport Strategy](#)¹ is the overarching strategy for transport in the district. Its main objective is to create *'a transport system that is safe, decarbonised, healthy, well connected, and accessible to all'*. It recognises there is a need to integrate land use and transport planning. This includes the benefits of increased employment opportunities in the district and ensuring strong links between town centres and the transport network.

¹ Towards a Sustainable Transport System: A Strategy for Managing Transport on the Kapiti Coast 2008

The strategy seeks to have the Kāpiti Coast district's transport and access network developed in a way that:

- (a) increases the connectivity between and within communities
- (b) reduces use of fossil fuels as an energy source and a source of greenhouse gases
- (c) increases the range of transport mode choices
- (d) provides alternatives to reliance on the state highway to access the district
- (e) recognises and provides improved and safe access for people with disabilities, older people and children
- (f) improves access to a range of social, economic, cultural and recreational services
- (g) delivers a quality of design and a network that recognises and respects the character and qualities of local areas
- (h) increases resilience
- (i) is integrated seamlessly across all transport modes
- (j) identifies and addresses effects on the environment.

The strategy is focused on supporting provision of a wider range of travel choices than the private car and creating a well-planned physical transport system that allows for the reliable, efficient and safe movement of people and goods. This will be achieved by working with partners in:

- (a) seeking that all new developments are well designed and planned
- (b) planning and implementing a transport network that is well connected and identifies, addresses and provides for opportunity for future growth
- (c) planning and constructing cycleways, bridleways and footpaths to provide safe access between home, work, shops, recreational and cultural facilities and schools
- (d) requiring that infrastructure needed to support new development is fit for purpose and adequately connects to the existing transport network
- (e) continuing to adopt a high level of construction standards

- (f) ensuring development provides an appropriate level of infrastructure to serve its needs without impacting on the existing network
- (g) ensuring environmental quality and all modes are addressed in new development
- (h) planning, developing and requiring a transport system that caters for the needs and safety of all road users including a safe and appropriate design speed
- (i) planning and implementing a road network that is designed to provide for potential future public transport service.

(ii) Network hierarchy

The road corridor is a shared space that has a major impact on the character of surrounding areas. The network hierarchy in the district plan has been developed to broadly identify road functions in terms of network management. However, awareness of the One Network Framework and other emerging guidance is recommended in considering the design of the development. These hierarchies apply road design typologies which will reflect the desired amenity and high-level design for each section of the road corridor. The Place and Link contexts and Table 3.1 in NZS 4404:2010 should be used as minimum requirements for decision-making on transport infrastructure and services.

In considering new development, the network hierarchy in the district plan and the One Network Framework provides for the following:

- identification of the function of a route
- separate identification of the volumes of traffic along the route. A route may be classified as significant for walking, cycling and or horse riding
- clear allocation of space across all modes, if possible
- allocation of broad design solutions which provides:
 - for the overall movement and place function of the route
 - provides a solution relevant to the traffic volumes
 - for the particular character along the route.

This framework separates design and allocation of space across modes from being driven by just traffic function and volumes. Broad road design ‘typologies’ for the routes are to be applied taking all transport modes and streetscapes into account. The One Network Framework is shown in figure 3 below from Wahi Kotahi’s website.

Figure 3: [One Network Framework](#) – New Zealand’s national classification system.²

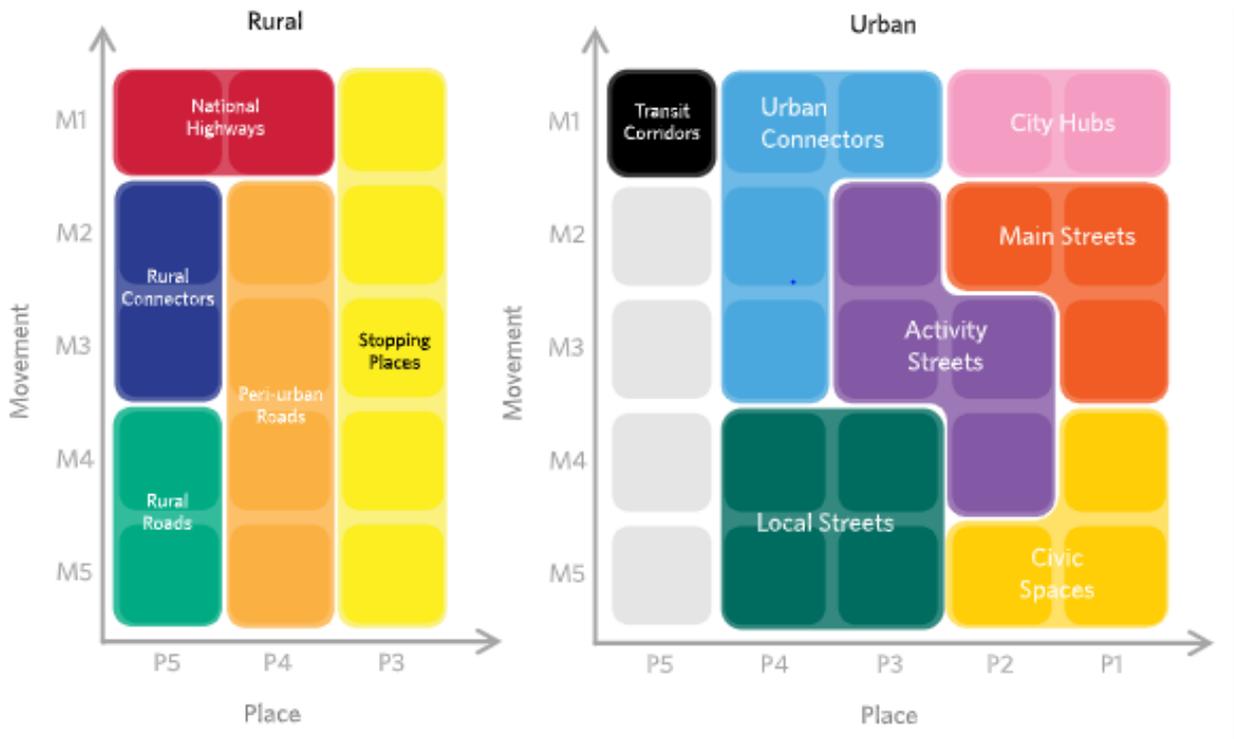


Table 3.2 in NZS 4404:2010 should be used as the basis for road design, except where the schedules in the Council’s Land Development Minimum Requirements specify otherwise.

(iii) Performance criteria

The layout and structure of a road network and its associated amenities shall:

- (a) meet the relevant standards and criteria of the district plan and Council’s engineering requirements.

² The network hierarchy in the district plan has been developed to broadly identify road functions in terms of network management, however awareness of the One Network Framework and other emerging guidance is also recommended in considering the design of development.
Source: Waha Kotahi New Zealand Transport Agency

- (b) be appropriate for its position in the road hierarchy
- (c) provide safe roads with safe and appropriate operating speeds
- (d) provide linkages and connectivity
- (e) provide good connections for promotion of sustainable transport modes
- (f) provide for the safe, efficient, and comfortable passage of motor vehicles (including emergency vehicles [refer SNZ PAS 4509:2008 for standard] and public transport), cycle and pedestrian traffic (including the mobility impaired), and, where appropriate, horse riding
- (g) accommodate the likely (assessed) demand for car parking arising from the development and be able to safely and efficiently cater for existing and future car-parking demand.
- (h) be of sufficient strength to cope with design loads
- (i) be of adequate width and gradient to allow ease of passage, as constrained by land form and parking demand
- (j) provide for low-impact stormwater drainage (if appropriate), landscaping and utility services
- (k) minimise noise to a level compatible with the character of the neighbourhood
- (l) where access points are not clearly identifiable at the subdivision or development stage, demonstrate that all lots are able to be accessed in accordance with clause 3.3.17 of NZS 4404:2010.

(iv) Design principles

The Council has reserved control in the district plan over the design and layout of subdivisions and some aspects of development. As noted above, the Council has adopted a Sustainable Transport Strategy which was developed after comprehensive consultation with the community and other stakeholders.

The Council will ensure new developments consider the place and link aspects outlined in NZS 4404:2010; the need to link with and use public transport networks

efficiently; provide for connectivity; and promote ease of use of all transport modes such as walking and cycling.

The Council will ensure new developments support the road design principles set out in its [Best Practice Subdivision and Development Guide](#) and [Streetscape Strategy and Guidelines](#).

Designs of roads, rights of way and other access facilities should be site specific and consider site constraints and opportunities. They should be designed as part of an integrated development looking to:

- achieve residential amenity
- enhance connectivity, safety, access and manoeuvring for fire-fighting appliances
- calm traffic
- manage stormwater
- minimise earthworks
- avoid destruction of natural features.

Developments need to meet the roading hierarchy requirements of the Council's [district plan](#), [Sustainable Transport Strategy](#), [Best Practice Subdivision and Development Guide](#) and [Streetscape Strategy and Guideline](#) and provide high quality pedestrian and cycle links.

New roads within developments should connect with existing and new roads where possible and allow for connections to adjoining land. As such, Council will not permit cul-de-sacs, particularly long ones, or loop roads where connections are possible. Where cul-de-sacs or loop roads are used, then pedestrian and cycling links to enhance connectivity must be provided at the width specified in NZS 4404:2010.

In accordance with the district plan and NZS 4404:2010 the Council's preference is for rights-of-way to serve no more than six lots. Where there are seven or more lots, then legal roads should be provided unless otherwise approved by Council.

Cycleways, walkways and bridleways may be required in accordance with the Council's [Cycleways, Walkways and Bridleways Strategy](#) and the indicative network.

(v) Design and access statement

Applicants shall submit a design and access statement with their application for design approval as set out in clause 3.2.6 of NZS 4404:2010. The statement shall show how the design conforms to the Council's Transport Strategy and the performance criteria and design principles outlined above.

When evaluating the ultimate effects of the proposed development on the surrounding communities and transportation network, traffic modelling or surveying may be required at the Council's discretion. It is recommended land developers and their consultant discuss with Council staff early on to reach agreement on the scope and nature of the modelling and data collection necessary before lodging a consent application.

(vi) Road Safety Audits (RSAs)

All applications for consents or planning approval that have a roading component shall follow the most up-to-date Waka Kotahi New Zealand Transport Agency's Road Safety Audit Procedures for Projects Guideline and Austroads. In particular, this guideline requires audits at three stages throughout a project, being:

- feasibility/concept and scheme/ preliminary design stages
- detailed design stage
- post construction stage.

This audit requirement shall apply to all applications that involve subdivision with land to be vested in the Council as road, or any land-use resource consent involving a vehicle crossing or entrance that accommodates more than 200 vehicles per day. The Council may require audits in other situations where it considers safety may be an issue, such as access onto the state highway or other arterial and collector roads.

The applicant should consider carefully the independence, experience and suitability of the people engaged to carry out the audits. Auditors are expected to be experienced RSA practitioners and the Council's preference is for RSAs to be carried out by an audit team comprising at least two practitioners. If the independent audit team engaged by the developer considers any stage of the RSA is not required, the lead auditor may complete an 'exemption declaration' as described in the guideline and submit it as part of the application process. The Council may then either accept or refuse the application.

The Council is mindful that RSA findings can sometimes conflict with sustainable urban design initiatives. Applicants should resolve any such conflicts with the Council at an early stage. The Council will generally seek to reach a balance between the safety and urban design objectives.

The applicant shall submit the initial RSA report at the feasibility/concept stage (if this stage is required) or with their applications for consents. They should submit the second audit report with their construction drawings and their final post construction audit before being granted the 224 certificate for the development. If a report is provided at the feasibility/concept stage, then an updated report may be required at the application for consent stage.

RSA reports should be submitted to Council including the audit findings with the designer's response completed.

(vii) Means of compliance

Section 3, Roads, of NZS 4404:2010, except as modified by the schedule titled *Schedule 3, Kāpiti Coast District Council Altered Requirements to Section 3 NZS 4404:2010, Roads*, provide a means of compliance with the Council's requirements.

If there is any conflict between the requirements in this Section and NZS 4404:2010 then the requirements in this section take precedence.

Alternative specifically designed proposals may be submitted with appropriate engineering information that will enable the Council to assess the viability of the proposal.

E. Stormwater

(i) Stormwater strategy

The Council has adopted a strategy for stormwater management, titled *Stormwater Management Strategy*. The strategy summarises the main issues and describes the processes and priorities for addressing them. It notes that the Council will continue to manage the location and density of development based (amongst other factors) on the level of risk identified via flood hazard maps and rules set out in the district plan, and that this will include areas where development may not occur at all, or where particular conditions will be placed on development to reduce risks. The strategy also notes that

flood hazard maps will be regularly updated as new material becomes available, including impacts of climate change on stormwater and the effects of completion of new infrastructure projects on risk levels.

Greater Wellington has reviewed its regional planning documents and framework to reflect the requirements of the National Policy Statement for Management 2020 (NPS Freshwater). The NPS Freshwater requires freshwater to be managed in a way that 'gives effect' to Te Mana o te Wai, that is, in a way that recognises the inherent connection water bodies have to tāngata whenua identity and the mana of the area. The emphasis is on improving degraded water bodies, and maintaining or improving all others, using bottom lines defined in the Freshwater NPS (or through the Whaitua process). Under this regional and national planning framework, Council is reviewing its Stormwater Management Strategy. Applicants should ensure they are working with the most recently adopted versions and cover relevant aspects of these guidelines in their resource consent applications (to the extent applicable).

Developers need to consider the matters contained in the [Stormwater Management Strategy](#).

(ii) Stormwater objective

The Council's stormwater objective is to have a stormwater drainage system that minimises the risk of surface water flooding to acceptable levels and protects public and private property from inundation. The Council seeks to have high standard, sustainable stormwater systems that minimise the effects of flooding, erosion and water pollution and that take into account climate change. Refer also to **Part 2 C (ix)** above concerning stormwater issues for developments.

(iii) Stormwater management

Stormwater systems shall minimise environmental impacts, which includes pollution of waterways, coastal and marine environments, erosion and habitats. The Council is committed to sustainable development, and, as such, encourages the development of stormwater systems that will have a low impact on the receiving environment. This includes reduced pavement areas, permeable pavements, wetlands, ponds, swales, soak pits and attenuating devices to minimise environmental concerns and maintenance expenditure.

Rather than immediately directing stormwater to the kerb or a piped system from developed lots, developments or redevelopments, stormwater shall be attenuated or disposed of on site, unless this is shown to not be feasible. Appropriate site investigations will be required to ascertain the acceptability of on-site disposal.

Watercourses shall remain in a natural state wherever possible. Channel lining shall only be considered where planned maintenance is not considered appropriate or there is a threat to life and property. Any lining shall be carried out in a manner and by a method that is sensitive to the surrounding environment. Piping or closing in of natural waterways is not recommended and will only be approved in exceptional circumstances. Consent for such work may be required from Greater Wellington.

(iv) Reserves credit

Land that is required to be used for stormwater or flood mitigation does not count towards development impact fees for reserves where it is inundated up to the 1- in 10-year event. Land that is inundated between the 1- in 10-year and 1- in 100-year events **may** be considered for credit depending on the degree to which it supports Council's open space priorities. Criteria for assessment and a process for determining primary and secondary functions of such land is provided in Council's Open Space Strategy. Acceptance of such agreements is at Council's discretion on a case-by-case basis.

(v) Performance criteria

A stormwater system proposed for a development shall:

- meet the relevant standards and criteria of the district plan, the Council's Stormwater Management Strategy, the Greater Wellington Proposed Natural Resources Plan, Regional Freshwater Plan and the Regional Plan for Discharges to Land and other relevant RMA planning instruments
- provide for the collection and/or control of stormwater, allowing for ultimate future development within the catchment or adjoining catchments and for climate change
- achieve hydraulic neutrality so that peak flows into the receiving bodies for the 1 in 2-year, 1 in 5-year, 1 in 10-year, 1 in 50-year and 1 in 100-year design rainfall events shall not exceed the pre-development peak flows for the same design rainfall events
- provide for climate change predictions as advised by the Council

- meet the requirements of any stormwater management plans
- create a multifunctional landscape where the design integrates with other aspects of site planning and provides multiple benefits
- make use of available natural features and processes on site wherever possible
- result in minimal disturbance to the site and natural water systems
- preserve and/or recreate natural landscape features
- reduce impervious cover as far as practical
- facilitate detention and infiltration opportunities
- address flood events and preserve treatment systems through off-line storage and by-passes
- meet regional and district stormwater discharge quality requirements
- have stormwater treatment systems based on created natural systems (e.g. wetlands, lakes and detention ponds) that can mimic natural processes and function as entire ecosystems
- comprise simple, non-structural, low-tech and low-cost methods
- identify opportunities for enhancement.

(vi) Design principles

The following paragraphs set out principles and requirements to be applied in developing stormwater systems.

1. *Design for integration*

The Council seeks to promote the use and enhancement of natural systems for stormwater treatment and integration into the environment through subdivision and development design. When assessing proposals for subdivision and development the Council will look to:

- (a) ensure development styles and stormwater management methods that mimic natural runoff patterns

- (b) ensure protection and enhancement of riparian vegetation
- (c) minimise vegetation loss in riparian areas associated with development
- (d) ensure sufficient water flows are maintained to support healthy aquatic life
- (e) promote the restoration of degraded or piped channelled streams
- (f) promote the remediation of existing barriers to migration of weak, climbing native aquatic species
- (g) ensure the use of low-impact design for development, where appropriate and practicable
- (h) promote the use of swales within road reserves, where appropriate
- (i) promote the use of rain gardens in areas which are largely impermeable, such as car parks
- (j) promote on site disposal, where practicable and appropriate
- (k) promote the use of soft engineering or bioengineering solutions
- (l) promote the exclusion of stock from water bodies and their margin
- (m) avoid straightening of streams and, for streams already in a forced alignment, encourage the realignment into a natural pattern
- (n) consider whole-of-life costs and maintenance schedules.

2. *Efficient use of water resources*

Encourage the efficient use of water resources within subdivision and development through the use of stormwater as a water resource for non-potable uses. When assessing proposals for subdivision and development the Council will look to:

- (a) promote the use of stormwater methods that minimise, retain, treat and reuse stormwater runoff within the development for non-potable uses such as toilets, laundries, irrigation and fire fighting
- (b) ensure once treated that the quality of stormwater is of a standard suitable for the proposed use where it will be used in contact with people

- (c) ensure specifications for stormwater treatment devices take into account habitat requirements.

3. *Minimise effects of development*

Ensure new subdivision and developments are compatible with existing natural (ecologically intact) water systems as far as practically possible, or replicate natural systems, and minimise the increase of stormwater runoff from those sites. When assessing proposals for subdivision and development the Council will look to:

- (a) achieve hydraulic neutrality such that post-development peak flows do not exceed pre-development peak flows
- (b) minimise the adverse effects of activities on habitat quality and promote sustainable solutions
- (c) avoid creating barriers to upstream movement of weak, climbing native aquatic species
- (d) prioritise solutions that also address water quality and habitat values by ensuring a practical balance is achieved to address both flooding and ecological considerations
- (e) as far as practical, ensure secondary flow paths are located in public land. If impractical, then ensure they are located in areas where they are unobstructed by fences or planting. If critical, this requirement will need to be protected through easement
- (f) in areas subject to flooding, ensure the type of planting is not species known to exacerbate flooding
- (g) consider effects on groundwater quality and levels allowing for current levels, climate change and seasonal variations
- (h) avoid locating new subdivision and land-use activities in an area identified in the district plan maps as at high risk from natural hazards. Where a risk can be removed, to allow development on part of a site through mitigation, any mitigation and land-use activities will demonstrate they do not exacerbate the adverse effects of natural hazards for other people and properties.

4. *Compatibility of treatment and disposal systems*

Ensure any stormwater treatment and disposal/use systems proposed in a subdivision or development can maintain and enhance the condition of natural systems, as well as the system's ecological, landscape, recreational, cultural and safety values. When assessing proposals for subdivision and development the Council will look to:

- (a) promote the use of stormwater management devices that are designed to increase habitat opportunities
- (b) avoid the piping and channelling of streams
- (c) consider the treatment of road runoff within a development, before discharge to natural systems
- (d) ensure that groundwater quality and levels are not adversely affected
- (e) ensure stormwater infrastructure (including human-made natural systems) is designed to minimise long-term maintenance costs
- (f) ensure stormwater systems do not conflict with operating other utilities
- (g) ensure public safety in terms of managing stormwater and provide adequate signage for areas known to have changing water levels and contaminants.

(vii) Design requirements

The design of a stormwater system shall include the following:

1. Stormwater drainage systems shall consist of both a primary system to cater for the more frequent rainfall events and a system of secondary flow paths to cater for higher-intensity rainfall events and occasions when there are blockages in the primary drainage system.
2. The primary stormwater drainage system shall be designed to adequately cater for the following rainfall events:
 - 10% Annual Exceedance Probability (AEP) (10-year) rainfall event for industrial/commercial areas and residential areas
 - 20% AEP for rural areas

Land Development Minimum Requirements

- 10% AEP (10-year) rainfall event for culverts. However, culverts may need to be designed up to 1% AEP depending on circumstances. This will be determined on a case-by-case basis
 - 1% AEP (100-year) rainfall event for all situations where secondary overflow paths are not available or where these are through private property.
3. Design shall take into account climate change guidance. The allowance should be based on latest Rainfall Isohyet Plans or NIWA's HIRDS (high intensity rainfall design system) V4.
 4. Secondary flow paths shall be designed to adequately cater for the full 1% AEP (100-year) flow less an appropriate contribution from the primary drainage system. The contribution from the primary drainage system shall take account of the risk and likely degree of blockage as well as the capacity of the system inlets. Allowance for 100% blockage may be necessary in certain situations. Providing additional capacity in the primary drainage system does not eliminate the need to provide a secondary flow path.
 5. Where soak pits are used as the primary drainage system, then a secondary flow path is required to carry stormwater away from the site in case of failure. This is required even if the soak-pit system is designed to the 1% AEP. If this is not physically possible, allowance for additional freeboard may be required.
 6. Avoid locating new subdivision and land-use activities in an area identified in the district plan maps as at high risk from natural hazards. Where a risk can be removed, to allow development on part of a site through mitigation, any mitigation and land-use activities will demonstrate they do not exacerbate the adverse effects of natural hazards for other people and properties.
 7. Building sites within subdivisions shall be above the flood level of the 1% AEP storm event plus an approved freeboard.
 8. Areas of private property may be able to flood (usually not exceeding 300mm) provided these areas are not used as building sites. Similarly, roads may be flooded up to 200mm, in an 1% AEP storm event. A distinction is made between inundation caused by ponding and inundation where flood waters are likely to generate scour velocities and consequential erosion. It should be noted that Council will assess all properties subject to periodic inundation as part of the building consent process under Section 72 and may place a certificate on the land title.

9. Detention and/or storage devices may be required as part of a development to mitigate stormwater effects on downstream catchments. Such devices shall provide for grit and debris entrapment and be designed for ease of maintenance.
10. The proposed stormwater system shall be compatible with the existing drainage network and comply with current requirements as identified by the Council.
11. The system design shall identify and incorporate downstream improvements required, as a result of the proposed works.
12. Design of stormwater systems shall be based on the isohyet charts produced by the Council for the Kāpiti district or NIWA's HIRDS (high intensity rainfall design system) V4. These isohyet charts, and guidelines for their use, are set out in Schedule 4 and include a set of maps accounting for climate change. The methodology must be used when development solutions include storage. The use of Council's hydraulic models to assess effects in these situations is recommended.

(viii) Greater Wellington Regional Council requirements

Activities such as the discharge of stormwater, damming and diversion of water courses, establishment of structures and works in the beds of rivers or in the coastal marine area, are governed by rules in Greater Wellington's Proposed Natural Resources Plan.

Applicants should consult with the Greater Wellington Regional Council (Greater Wellington) to determine:

- whether or not resource consents are required from Greater Wellington for the activities they intend to undertake
- whether the proposed subdivision and development is affected by flooding and any implications
- what conditions must be met to comply with permitted activity rules.

If available, any Greater Wellington requirements shall be noted in resource consent applications to the Council. If their requirements are not available at the time of lodging consent applications, then the applications may be put on hold until such time as any requirements are provided to the Kāpiti Coast District Council.

(ix) Stormwater quality

Maintaining good water quality is essential to human health, the environment and the recreational value of waterways, wetlands and coastal waters. Awareness of the environmental conditions and human activities that influence water quality is an important consideration in effective water management.

Stormwater quality issues shall be addressed during planning, construction and for final intended uses.

The applicant must consider the integrated treatment approaches that blend products, technologies and practices which mimic natural processes to maintain or enhance overall community and environmental values and provide utility services for stormwater management.

With an increased focus on urban intensification, careful integration of stormwater management with land use will be required.

Pre-treatment devices are required to be constructed to prevent floating contaminants and debris entering the wet ponds or other treatment systems.

Existing water bodies shall be protected from contaminants generated by the development.

The design and construction of any treatment facilities shall be undertaken in such a way that future maintenance and ownership is easily identified.

(x) Low-impact design references

The Council has developed a design guide, [Low Impact Urban Design and Development Stormwater Guidelines](#) This guide has been based on NZWERF *On-Site Stormwater Management Guidelines* which, in itself, is an acceptable design guide. There are several other references and publications that provide appropriate guidance on low-impact design. These can be found in the referenced documents and related documents sections of NZS 4404:2010.

When designing and constructing ponds or lakes, refer to the Greater Wellington publication [So you're thinking about a pond](#).

(xi) Relevant information

The Council has significant information about catchments, flood plains, flood levels, waterways and existing systems. Developers should approach the Council and obtain any relevant information it has that may be relevant to their proposed development.

(xii) Design methods

Design methods shall be in accordance with NZS 4404:2010 Section 4, Stormwater as modified by the schedule titled *Schedule 4, Kāpiti Coast District Council Altered Requirements to Section 4 NZS 4404:2010, Stormwater* or as otherwise specifically approved by the Council.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

(xiii) Construction

Constructing stormwater systems shall be undertaken in accordance with the requirements of Section 4, Stormwater of NZS 4404:2010, except as modified by the schedule titled *Schedule 4, Kāpiti Coast District Council Altered Requirements to Section 4 NZS 4404:2010, Stormwater*, unless otherwise approved by the Council.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

Low-impact designs and other alternative specific proposals shall have construction details referenced to an appropriate design guide and/or have full construction details provided, with appropriate supporting engineering information.

(xiv) Building Act 2004

A stormwater attenuation pond with a water depth in excess of 400mm that is constructed on a site containing, or adjacent to, any residential dwelling, may require fencing in compliance with the requirements of the Building Act 2004.

F. Wastewater

(i) Objective

The Council is seeking to have reliable, affordable and environmentally acceptable wastewater collection and disposal systems that protect public health and safety, and the environment, and which are adequate to meet present and future needs.

Wastewater systems shall minimise environmental impacts including erosion, pollution of waterways, coastal and marine environments and habitats. Development of alternative wastewater systems that minimise environmental concerns and/or maintenance expenditure will be encouraged.

Subject to compliance with Greater Wellington's Proposed Natural Resources Plan, greywater from laundry washing machines and bathrooms for subsurface irrigation by approved systems is possible.

Where the Council's wastewater network is available to service developments then each lot shall be provided with a connection and each development shall be provided a piped wastewater system connecting to the Council's system, unless alternatives are approved by the Council.

(ii) Performance criteria

The design of a wastewater system shall include the following:

- meet the relevant standards and criteria of the district plan and the Greater Wellington regional plans
- provide for the collection of wastewater, allowing for ultimate future development within the catchment or adjoining catchments
- minimise health and safety-related risks
- be compatible with the existing wastewater system
- prevent stormwater ingress (inflow and infiltration) into the system and prevent sewage egress out of the system
- provide a connection for each lot, where the Council wastewater system is available

- ensure on-site systems (where required) are compatible with daily flow, wastewater characteristics and soil/site conditions so that pollutants can be successfully eliminated without exceeding the carrying capacity of the receiving environment
- consider the Kāpiti Coast District Council Low-Pressure Sewer System policy and standard/specification documents, available from the Council's Water and Wastewater Team
- consider the Kāpiti Coast District Council Pump Station standard/specification document, available from the Council's Water and Wastewater team.

(iii) Greater Wellington requirements

The discharge of wastewater is governed by rules in Greater Wellington's Proposed Natural Resources Plan. Applicants should consult with Greater Wellington to determine:

- whether or not resource consents are required from Greater Wellington for the activities they intend to undertake
- what conditions must be met to comply with permitted activity rules.

If available, any Greater Wellington requirements shall be noted in resource consent applications to the Council. If their requirements are not available at the time of lodging consent applications, then the applications may be put on hold until such time as any requirements are provided to the Kāpiti Coast District Council.

(iv) Design principles

The design of a wastewater system shall include the following:

- Design methods shall be in accordance with NZS 4404:2010 Section 5, Wastewater as modified by the schedule titled *Schedule 5, Kāpiti Coast District Council Altered Requirements to Section 5 NZS 4404:2010, Wastewater*, or as otherwise specifically approved by the Council.
- Pipe sizes shall be based on the design flow without surcharging, but those mains to pass into Council ownership shall be a minimum of 150mm diameter, except as detailed in paragraph (v) below.
- The design flows shall be calculated using the flow parameters detailed in Schedule 5.

- The proposed wastewater system shall be compatible with the existing network and comply with current requirements as identified by the Council. If demand on the system requires use of the Council's wastewater reticulation model to ascertain effects, then this will be at the applicant's cost.
- The system design shall identify and incorporate downstream improvements required as a result of the proposed works.
- Where a proposed development cannot be adequately serviced by a gravity system, a public wastewater pumping station may be proposed for the Council's consideration, provided it is located and designed to service the entire area of potential catchment beyond the reach of the gravity system, and so long as the design provides the minimum whole-of-life cost. The land area to be served shall be demarcated based on sound engineering practice. A financial contribution towards future operation, maintenance and replacement will be required. See also paragraph (vii) of this section.

The Council may consider an alternative where individual lots pump into a common rising main vested in Council. In this situation, pumps and tanks are located on the lots and are the responsibility of the private owners.

- Where land is identified for possible future development upstream of the proposed development, the applicant shall negotiate with Council for possible upsizing of the proposed development's reticulation.
- On-site wastewater disposal systems shall be specifically designed taking into account the daily flow, wastewater characteristics and site/soil conditions, and meet the requirements of the Proposed Natural Resources Plan. (See also Greater Wellington website: [Onsite Wastewater](#).)

(v) Private and public drains

A private drain (generally 100mm diameter) is a drain which serves one lot, regardless of the number of dwellings on that lot and whether it traverses adjacent lots.

Common drains are not a preferred Council option. A very compelling engineering reason must exist (noting that cost is not an engineering reason) before the Council will consider these and its decision is final. In very limited cases, drains with appropriate easements serving more than one lot will be considered common, private drains.

These drains require a Common Private Drain Agreement between all landowners served by the drain.

Where multiple houses are constructed on a single lot and a subdivision is likely to be undertaken in the future, the developer should consider providing individual drains to each house to avoid future works at subdivision stage to separate drains.

Public drains include:

1. any drain or pipeline which serves more than one lot, except where a common private drain situation applies
2. the section of 100mm diameter drain within the road reserve between the lot served by it and the pipeline to which it connects
3. any drain over which the Council has exercised control for a period of not less than 20 years
4. drains for the general interest of the district as opposed to the particular or personal benefit of one or two individuals or households are generally public drains
5. any drain so declared under Section 462 of the Local Government Act.

(vi) Alternative wastewater systems

The following principles apply when providing alternative wastewater systems.

(a) Compatibility of treatment and disposal systems

Ensure any wastewater treatment and disposal/use systems proposed in a subdivision or development can maintain and enhance the condition of natural systems and the ecological, landscape, recreational, cultural and safety values of that system. When assessing proposals for subdivision and development the Council will look to:

- require monitoring and maintenance of alternative systems provided as part of the supplier's contract for a reasonable time after installation depending on the specific system installed
- encourage the use of the latest monitoring technology by providing a 24-hour monitored system compatible with Council systems

- ensure that sites using on-site wastewater systems in a community capacity use design and maintenance of the system that avoids direct discharge of inadequately treated contaminants into natural water bodies and into the air.

(b) Reuse of greywater

Encourage the safe and efficient use of water resources within subdivision and development by using treated greywater from community and/or neighbourhood systems as a water resource for non-potable uses and/or using subsurface greywater irrigation systems. Treatment systems shall be specifically designed by a suitably qualified and experienced person. Applicants are referred to *AS/NZS 1547:2012 On-site domestic wastewater management* and the relevant provisions of the New Zealand Building Code.

Where a greywater re-use system is proposed in response to the water demand management provisions of the district plan, applicants are referred to those provisions in the district plan and Council's [*Rainwater and Greywater Code of Practice*](#).

When assessing proposals for subdivision and development the Council will look to:

- ensure the public are aware of areas where non-potable supplies exist as well as the precautions necessary for their use
- require the plumbing of new dwellings in communities where non-potable water is used to prevent any cross-contamination of potable water supplies thus allowing grey and black water to be separated for treatment on site.

(c) On-site wastewater systems

Promote, where appropriate, the use of ecosystem services for wastewater treatment and assimilation into the environment as neighbourhood systems in areas not connected to the reticulated wastewater system or where it is inefficient to connect to the reticulation system. When assessing proposals for subdivision and development the Council will look to:

- ensure developers use suitably qualified and experienced on-site wastewater treatment suppliers, who are involved with whole-of-life monitoring and maintenance of the systems
- ensure approved systems provide an acceptable level of risk that is balanced between environmental, efficiency and public health concerns

- ensure appropriate involvement of Greater Wellington, regional public health authorities and iwi in the assessment procedure
- approve on-site wastewater systems only where:
 - the public reticulated system is not available or is at capacity, or
 - connection to the public, reticulated wastewater system is not desirable due to site, environment, integrated subdivision design or cost constraints which would result in the connection being inefficient and a lower environmental result, and
 - the system results in a reasonable level of maintenance and responsibility for the future owner.

If a proposed subdivision and development uses an on-site wastewater system, the developer shall obtain the Council's approval for the system (whether community or individual household-based) before the subdivision is approved. Where a community-based system is proposed, the developer shall be responsible for installing any common on-site treatment facility (secondary treatment and disposal). This shall be installed either before the section 224c approval or bonded until such time as the first future lot owner applies for a building consent. Greater Wellington consent may also be required for community-based systems.

To enable the Council to evaluate an on-site system, the applicant needs to provide the following information:

1. Geotechnical survey including comprehensive soil and site evaluation – constraints include mineralogy, water table and available space.
2. An evaluation of the site on which the system is to be constructed. The evaluation needs to provide enough information to determine if the site can support an on-site wastewater treatment and disposal system, what system design concept to use, and what design parameters to follow. The components of a soil and/or site evaluation are:
 - topography and landscape position
 - soil characteristics: soil texture, structure, clay mineralogy and organic soils
 - soil wetness conditions in all seasons

- soil depth
 - soil permeability
 - groundwater level
 - restrictive horizons
 - available space (the area of suitable soil, the required setbacks, other site layout factors relevant to the development).
3. The system design, including:
- the design wastewater flow and characteristics
 - the type of pre-treatment
 - the type of treatment method
 - the type of distribution and odour treatment
 - the proposed wastewater system and its location
 - the conditions for any site modification
 - compliance with the Regional Plan for Discharges to Land, Greater Wellington Regional Council.

For community-based systems, a compliance certificate will be required once the system is properly installed. This shall contain system type, system performance, operation and maintenance requirements, as-built drawings, operating manuals, asset management plans, a life-cycle analysis, system monitoring and reporting requirements, and a copy of the section 221 notice.

(d) Greywater reuse

Subject to meeting the requirements of the Natural Resources Plan, greywater from laundry washing machines and bathrooms may be used for subsurface irrigation. The greywater systems proposed require Council and Greater Wellington approval. Installation and operation shall be in accordance with the [*Kāpiti Coast Rainwater and Greywater Code of Practice*](#).

(vii) Pumping mains and pump stations

The Council will only consider and approve pumping stations when all other options, including pumping from individual lots to a Council rising main, are impracticable. Where required, pumping stations shall be provided at the developer's entire expense and located in publicly-owned property. If properly designed and constructed to the Council's approval, the Council will take over their future operation and maintenance after they have been commissioned.

A financial contribution towards on-going maintenance costs will be required. This contribution will be based on the net present value of the ongoing operation, maintenance and replacement costs. Design of pumping stations shall be carried out by suitably qualified persons. *Schedule 5, Kāpiti Coast District Council Altered Requirements to Section 5 NZS 4404:2010, Wastewater* covers the Council's general requirements, however designers will need to consult Council staff at an early stage.

(viii) Construction

Construction of wastewater systems shall be undertaken in accordance with the requirements of Section 5, Wastewater of NZS 4404:2010, except as modified by the schedule titled *Schedule 5, Kāpiti Coast District Council Altered Requirements to Section 5 NZS 4404:2010, Wastewater*.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

Alternative specific proposals may be submitted with appropriate engineering information that will enable the Council to assess the proposal.

(ix) Approved contractors

Construction of wastewater reticulation systems shall only be undertaken by contractors approved by the Council. The Council will hold a list of approved contractors who have met the appropriate criteria. Criteria that are required to be met are:

- registered drain layer
- current certificates of immunisation for Hepatitis A and B, tetanus and typhoid

- a health and safety plan including a current *approved contractor's letter* and completed contractor's health and safety obligation form.

G. Water supply

(i) Water supply management

The Council seeks to have a reliable potable water supply to acceptable quality and reasonable quantity standards which will meet the community's present and future water supply needs to protect public health and meet fire-fighting requirements, while promoting water conservation.

The Council is looking to reduce peak consumption to reasonable, sustainable levels using a range of demand management measures. The goal is to achieve average peak consumption of 400 litres per person per day plus 90 litres per connection per day for losses. This is set out in the Council's publication [Water Matters, Kāpiti Coast District Sustainable Water Management Strategy](#). For development design purposes, the consumption and fire-flow requirements shall comply with NZS 4404:2010, clause 6.3.5.

To aid this process, developers are encouraged to aim to make efficient use of available water sources within a site by providing for sustainable systems of collection and use of rainwater, bore water and greywater (see paragraph (vi) (b) & (d) of the Wastewater section).

Where the Council's potable water supply network is available to service developments, then each lot shall be provided with an individual connection from the main to the property boundary. Each development shall be provided a piped, water supply system connecting to the Council's system, unless alternatives are approved by the Council.

All connections shall be metered and fitted with a double check valve. All commercial or industrial connections shall be metered and fitted with an RPZ-type backflow preventor. Under the Water Demand Provisions of the district plan the installation of rainwater tanks, or rainwater tanks and approved greywater irrigation systems, are required for new dwellings.

(ii) Performance criteria

The design of a water supply system shall include the following:

- meet the relevant standards and criteria of the district plan
- meet the requirements of the Kāpiti Coast District Council Water Supply Bylaw 2013, and any other future bylaws relating to the protection and supply of drinking water
- be appropriate for its position in the water supply hierarchy
 - be compatible with the existing water supply system
 - provide for an adequate water supply that will meet fire-fighting and domestic needs, and commercial and industrial requirements, which will allow for ultimate future development within the catchment or adjoining catchments, in accordance with *SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice*.
 - for rear allotments, the pipe shall be extended to the lot proper
 - minimise health and safety related risks
 - prevent contamination of the water supply system
 - where the Council water supply system is available, provide a connection for each lot from the main, with the manifold centrally located along the road frontage.

(iii) Design principles

The design of a water supply system shall include the following:

- Design methods shall be in accordance with NZS 4404:2010 Section 6, Water Supply as modified by the schedule titled *Schedule 6, Kāpiti Coast District Council Altered Requirements to Section 6 NZS 4404:2010, Water Supply*, or as otherwise specifically approved by the Council. If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.
- The use of satellite systems is not permitted. Pipe sizes shall be based on the design flows required to meet fire-fighting and supply requirements.
- Standard water supply service laterals shall be 20mm ID and laid perpendicular to the main and the road frontage. The design flows shall be calculated using the design

information detailed in *Schedule 6, Kāpiti Coast District Council Altered Requirements to Section 6 NZS 4404:2010, Water Supply*.

- The system design shall identify and incorporate improvements required to the existing network as a result of the proposed works. If demand on the system requires use of the Council's water reticulation model to ascertain effects, then this will be at the applicant's cost.
- On-site water supply systems shall be specifically designed. The focus of the design shall be on the efficient and safe use of water resources within a site. The water system proposed shall result in minimal disturbance to the site and natural water systems.
- It is a legal requirement there is a potable supply of water for any building intended for use as a dwelling house. Applicants are referred to the *Taumata Arowai Acceptable Solution* documents that provide details about individual household water supplies.
- Where on-site storage is required, this shall be a minimum of 30,000 litres (sufficient storage to supply four people for up to 30 days at 250 litres per person per day), unless otherwise approved by the Council, but 50,000 litres is recommended. The Council may require minimum storage of a greater volume.
- Where reticulated water supplies are unavailable or insufficient, an alternative fire-fighting water supply shall be provided in accordance with *SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice*. The fire-fighting requirement is over and above any on-site storage requirements, that is, independent of stored drinking water. All storage shall be on the application site and not in road reserve.

(iv) Relevant information

The Council holds significant information about the existing water systems. Developers should approach the Council and obtain any relevant information it holds that may be relevant to their proposed development.

(v) Pumping stations and reservoirs

A development may need the construction of booster pumping stations and/or storage to comply with requirements. Where these are required, the applicant shall consult with the Council's Water and Waste Assets Manager about the specific requirements, and

these shall be provided at the entire expense of the developer. If properly designed and constructed to the Council's approval, the Council may take over the pumping stations' future operation and maintenance after they have been commissioned. In some situations, the applicant may be required to make a financial contribution to cover future operation, maintenance and replacement costs. Design shall be carried out by suitably qualified and experienced people.

(vi) Construction

Construction of water supply systems shall be undertaken in accordance with the requirements of Section 6, Water Supply of NZS 4404:2010, except as modified by the schedule titled *Schedule 6, Kāpiti Coast District Council Altered Requirements to Section 6 NZS 4404:2010, Water Supply*.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

Alternative specific proposals may be submitted with appropriate engineering information that will enable the Council to assess the proposal.

(vii) Approved contractors

Construction of water supply systems shall only be undertaken by contractors approved by the Council. The Council will hold a list of approved contractors who have met the appropriate criteria. Criteria that are required to be met are:

- level 3 water grading certificate
- a competent water supply layer with experience in laying reticulation mains
- current certificates of immunisation for Hepatitis A and B, tetanus and typhoid
- a health and safety plan including a current *approved contractor's letter* and completed contractor's health and safety obligation form.

H. Landscape

(i) General requirements

Developers are encouraged to undertake landscaping within their developments to provide an interesting and varied living environment which is attractive to residents and visitors, and which supports good ecological outcomes as well as the life and vibrancy of the district's town and village centres, where appropriate. As a minimum, developers are required to:

- meet the relevant standards and criteria of the district plan
- respond to the priorities of the Council's Open Space Strategy, as appropriate, and any design guide(s) relevant to the subdivision or development
- consider low-impact urban drainage design (LIUDD) features in accordance with Council's [Low Impact Urban Design and Development Stormwater Guidelines](#).
- provide enhancements and landscape features which are appropriate to the landscape type and the context of the wider public space network (refer to the Categories and Management Standards of the Open Space Strategy)
- submit to the Council for approval a comprehensive set of landscape plans and schedules including a landscape design statement, landscape specification, general arrangement plan, levels and finishes for hardscape, fencing plan, planting plan and planting schedules
- complete the landscaping work in accordance with the approved landscape design
- maintain landscape areas for the duration of the agreed maintenance period.

Other landscaping and plantings may be required for specific locations such as riparian planting in drainage situations, coastal areas and adjacent to open space.

(ii) Protection of vegetation

Developers shall provide appropriate protection to both existing vegetation during the development period as well as all vegetation, including new plantings, during the landscaping maintenance period in accordance with clause 7.3.3 of NZS 4404:2010 and AS4970:2009 Protection of Trees on Development Sites.

(iii) Reserves

(a) Council policies

Financial contributions for reserves shall be in accordance with the district plan requirements and the Council's Open Space Strategy. Note that Council is considering whether to include development contributions for reserves and associated community infrastructure into its next review of the Development Contributions Policy. This would involve removing financial contributions for reserves from the Kāpiti Coast District Plan.

Criteria for the assessment of new open space proposals

Parts 4 and 5 of the Open Space Strategy 2022 provide guidance on Council's open space categories and processes for assessing new open space acquisitions.

Appendix 2 of the Strategy outlines the full assessment criteria for new open space acquisitions. In general, Council's assessment criteria are intended to provide a comprehensive assessment of:

- associated costs — cost considerations are evaluated against benefits as follows: financial investment, development costs, maintenance costs, administration and/or implementation costs, monitoring and enforcement costs
- the risks to community wellbeing of not proceeding, that is, lost opportunities, higher set-up costs, and development of land for uses not compatible with open space or recreational use.

In the first instance, developers should provide an assessment of new open space proposals for Council's consideration. Decisions to acquire new open space assets are at Council's discretion.

1. The strategic fit of the potential land acquisition. Sites that fit multiple criteria will generally be given a higher priority for acquisition than those which only fulfil one or two criteria. However, depending on the specific nature of the open space type required and the real or potential benefit of its acquisition into the public open space network, sites that fit only a few criteria may be sufficient in some cases.
2. Associated costs — Cost considerations are evaluated against benefits as follows: financial investment, development costs, maintenance costs, administration and/or implementation costs, monitoring and enforcement costs.

3. The risks to community wellbeing of not proceeding, that is, lost opportunities, higher set-up costs, and development of land for uses not compatible with open space or recreational use.

In the first instance, developers should provide an assessment of new open space proposals for Council's consideration. Decisions to acquire new open space assets are at Council's discretion.

Stormwater reserves

Land that is required to be used for stormwater or flood mitigation purposes does not count towards reserves contributions where it is inundated up to the 1- in 10-year event. Land that is inundated between the 1- in 10-year and 1- in 100-year events **may** be credited towards reserves contribution if it is usable and agreed by the Council.

Appendix 3 of the Open Space Strategy provides guidance on assessing the primary and secondary function of land in such cases.

(iv) Design and implementation

Landscape design and implementation shall be in accordance with NZS 4404:2010 Section 7, Landscape as modified by the schedule titled *Schedule 7, Kāpiti Coast District Council Altered Requirements to Section 7 NZS 4404:2010, Landscape* or as otherwise specifically approved by the Council.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

I. Network utility services

(i) General requirements

- (a) Subdivisions and developments are required to be serviced with electric power, telecommunications and, where applicable, gas reticulation to lot boundaries. These services are generally to be provided by an appropriate network utility operator. When a development or subdivision is complete, the Council requires written confirmation from the network utility provider that: (1) its installation requirements are met and (2) network capacity is available or planned.
- (b) Work undertaken on Council-owned roads shall be undertaken in accordance with the National Code of Practice for Utility Operators' Access to Transport Corridors, unless otherwise required in Kāpiti Coast District Council Local Conditions.
- (c) Consideration shall be given to co-locating services and shared corridors, where appropriate.
- (d) All urban services shall be underground unless otherwise authorised by the Council. It is encouraged, wherever practicable, that existing overhead services located on land proposed to be subdivided or otherwise developed are also relocated underground. Where existing services cannot be relocated, mitigation is required, and consideration shall be given to building orientation, visual screening and subdivision layout.
- (e) In some specific rural areas, the Council may require services to be underground. Otherwise, overhead reticulation is acceptable.
- (f) The Council may consider proposals for alternative means of providing electrical and telecommunication services, particularly in rural areas. The Council's approval for any alternative proposals should be sought before seeking resource consent approval. A section 221 notice will be required advising the alternative means of providing the service, and that the Council will not be liable to provide the service in the future.
- (g) Where a community-based power system is used, a compliance certificate shall be provided once the system is properly installed. This shall contain system type, system performance, operation and maintenance requirements, as-built drawings,

operating manuals, asset management plans, a life-cycle analysis, system monitoring and reporting requirements, and a copy of the section 221 notice.

- (h) In some very isolated areas where it is unlikely that electric power and/or telecommunication services will be required, the Council may agree these services need not be provided. In this situation, a Section 221 notice will be required advising that electric power and/or telecommunication services are not available to lot boundaries and that the Council will not be liable to provide the services in future.
- (i) The Council may require extra ducts to be laid, or consideration of location(s) for wireless base station(s), within a development for possible future requirements.
- (j) Easements are required in favour of the network utility service provider when not located on road reserve.

(ii) Design and construction

Design and construction shall be in accordance with NZS 4404:2010 Section 8, Network Utility Services as modified by the schedule titled *Schedule 8, Kāpiti Coast District Council Altered Requirements to Section 8 NZS 4404:2010, Network Utility Services*, or as otherwise specifically approved by the Council.

If there is any conflict between the requirements in this section and NZS 4404:2010 then the requirements in this section take precedence.

J. Waste services

(i) General requirements

All developments must comply with the Council's Solid Waste Management and Minimisation Bylaw 2021. This can be found [on the Council's website](#).

(ii) Design requirements

All developments must consider (where applicable) the following in the design process for waste services:

- Multi-Unit Dwelling Waste Storage and Servicing guidelines
- The Waste Management and Minimisation Plan
- The Multi-Unit Development Waste Storage Calculator
- The Multi-Unit Development Waste Storage Design Template.

These guidelines, plans, calculators and templates are available from the Council's Sustainability and Resilience team.

Contents: Part 4 Minimum engineering requirements

Introduction		84
Schedule 1	Altered requirements to Section 1 NZS4404:2010 General requirements and procedures	85
Schedule 2	Altered requirements to Section 2 NZS4404:2010 Earthworks and geotechnical requirements	96
Schedule 3	Altered requirements to Section 3 NZS4404:2010 Roads	100
	Schedule 3 Appendix 1 Lighting categories	114
Schedule 4	Altered requirements to Section 4 NZS4404:2010 Stormwater	118
	Schedule 4 Appendix 1 (SKM) Updated Isohyet Based Calculation of Design Peakflows	124
	Schedule 4 Appendix A: Rainfall Recurrence Isohyet Maps	154
	Schedule 4 Appendix B: Curve Number Delineation Tables	167
	Schedule 4 Appendix C: Time of Concentration Calculations	172
Schedule 5	Altered requirements to Section 5 NZS4404:2010 Wastewater	175
Schedule 6	Altered requirements to Section 6 NZS4404:2010 Waste supply	184
	Schedule 6 Appendix 1 Points of Supply and Typical Layouts (extract from Bylaw)	192
Schedule 7	Altered requirements to Section 7 NZS4404:2010 Landscape	196
Schedule 8	Altered requirements to Section 8 NZS4404:2010 Network utility services	199

Part 4: Minimum engineering requirements

Introduction

The minimum engineering requirements comprise:

- NZS 4404:2010, Land Development and Subdivision Engineering
- Schedules 1 to 8 containing Council's amendments and additions to NZS 4404:2010
- National Code of Practice for Utility Operators' Access to Transport Corridor
- the [Council's Construction Specifications and Standard Drawings](#) (CSSD) including an Approved Materials List as approved by the Council from time to time. The most current version of the CSSD is available to be viewed and downloaded in DPF or CAD file format from the Council's website

Other standards are as listed in NZS 4404:2010 or in Schedules 1 to 8.

SCHEDULE 1

Kāpiti Coast District Council

Altered requirements to

Section 1 NZS 4404:2010 General requirements and procedures

The Kāpiti Coast District Council has adopted Section 1 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 1.8.1** *Documents to be submitted for design approval*

- The Council requires the documents listed in paragraphs 1.8.1.1 (a) to (d) inclusive to be submitted. Specifications should include a discussion on the maintenance and operation of any non-standard feature. Where considered appropriate by the Council, cost benefit or life-cycle costing may be required for larger or unique projects.

Add to the existing paragraph:

- A street lighting design that is specific to the project as set out in clause 10 of Schedule 3.
- A sediment and erosion control plan as set out in clause 4 of Schedule 2.
- A completed design review certificate. The form that shall be used is that found in NZS 4404:2010.
- A design report (when required) as set out in paragraph (xiii) of Part 3B – General provisions. The template is available from the Council.
- A quality assurance plan as set out in paragraph (vii) of Part 3B – General provisions. The template is available from the Council.
- A project brief where community or small-scale distribution, renewable energy-generating technologies are proposed, as set out in paragraph 2 of Schedule 8.

2. **Clause 1.8.2** *Drawings*

Add further paragraph to 1.8.2.1:

Engineering drawings must be legible, clear, readable and complete. They must clearly illustrate the proposal and enable both assessment of compliance with the Council's Land Development Minimum Requirements and accurate construction. [Checklists](#) covering Council's requirements are available from the Council and are required to be submitted with all engineering drawings and as-built plans. In general, draughting requirements are as detailed in AS/NZS 1100.101:1992 *Technical drawing – General principles* and AS/NZS 1100.401:1984 *Technical drawing – Engineering survey and engineering survey design drawing*.

Add further paragraph to 1.8.2.1:

Two copies of preliminary drawings, specifications and calculations shall be supplied to the Council. One set will be returned to the applicant when these have been checked by Council staff with any required amendments endorsed on the plans and specifications. These check prints shall be preserved intact and returned to the Council when the required amendments have been completed, along with two copies of the amended set of plans and specifications.

The level datum used in the Kāpiti Coast district is Wellington Datum 1953, unless otherwise advised by Council. State both the source of the levels (the benchmark) and the datum used on engineering drawings.

3. **Clause 1.8.2.3** *Scale*

- (a) Non-standard scales such as 1:150, 1:300, 1:400, etc, are not acceptable. The scale of drawings is generally 1:250 or 1:500 but other accepted metric scales may be used to suit the level of details on the drawings.
- (b) For long-sections, draw horizontal scales generally to match the plan. Vertical scales may be 1:20 or 1:50, to improve clarity.

4. **Clause 1.8.2.4** *Content of drawings*

Add to the existing paragraph:

- (j) For low-impact design, any of the specific requirements listed in section 4.3.7.

5. **Clause 1.8.3.2** *Alternative design basis*

Addition to the first sentence of the second paragraph:

An explanation of the design basis or construction methods (together with the results of any material's testing) shall be submitted, for approval in principle.

6. **Clause 1.8.4** *Approval of design*

Add to the existing paragraph 1.8.4.1:

Once approved, and if requested by the Council, the owner or their representative shall resubmit amended plans, specifications or other documents, bearing the revision number and date.

In order to expedite the commencement of works, design approval in principle may be applied for before the granting of resource consent. However, design approval will not be given until after a resource consent is granted.

7. **Clause 1.8.5** *Notification of contracts and phases of construction*

The Council requires notification as set out in paragraphs 1.8.5.1 and 1.8.5.2.

8. **Clause 1.8.6** *Supervision of construction*

The level of supervision required should be proportional to the scale of the proposal and be considered as part of the quality assurance plan, as set out in paragraph (vii) of Part 3B – General provisions.

The Council requires completion certificates in the form given in schedules 1B and 1C.

9. **Clause 1.8.7** *Connection to existing services*

In meeting the requirements of clause 1.8.7.2 for water supply, the developer shall provide a completed Water Supply Connection/Alteration Application Form to the Council.

10. **Clause 1.8.8** *Testing*

Add to the existing paragraph:

The following Council test certificates are required to be completed by the Council's development engineer:

- pipeline pressure test
- hydrostatic testing of chambers
- pipe disinfection test.

Add new clause **1.8.8.1** *CCTV post construction inspections*:

Once the road surface is to finished level and before any road surfacing, the developer shall arrange for all public stormwater and sewer mains of 1200mm diameter or less to be inspected by CCTV. The developer shall provide an electronic file and defects report to Council. The filming shall be done travelling upstream with a trickle of water flowing downstream to allow hollows and steps to be easily seen. All defects are to be fixed to Council's satisfaction at the developer's cost. Where faults are found and then repaired, Council may instruct the developer to re-film those lengths to ensure there are no further problems.

11. **Clause 1.8.9** *Maintenance*

Replace the existing clause with the following:

The developer shall maintain the works until they are formally taken over by the Council. Formal takeover is the date when the Council issues the Section 224(c) certificates, or such other earlier date as may be agreed by the Council. For uncompleted works covered by a bond, the developer shall maintain the works until a date specified in the bond or, if earlier than such date, the works are completed to the satisfaction of the Council.

Unless stated otherwise in the consent conditions, a defects liability period of two years from formal takeover by the Council shall apply. For landscaping and reserves, including berms, or where low-impact devices or products are used, a defects liability period of two years shall apply. The developer is responsible (and may be bonded) for the establishment and routine maintenance and any replacement of the planting, lawns and associated works during the establishment period.

The developer shall monitor the situation to ensure the appropriate maintenance and/or replacement is undertaken and shall be responsible for arranging a final inspection by Council staff at the end of the defects liability period to get signoff for practical completion.

The maintenance bond can be progressively repaid as the bond term progresses and key milestones are reached, as negotiated with the Council's Open Space Asset Manager.

The developer shall not be responsible for damage caused by other activities, such as building construction on completed sections, or for fair wear and tear or vandalism caused by public use.

12. **Clause 1.8.10** *Completion documentation*

- (a) Other documentation required under sub-paragraph (g) includes specification and supplier details of all non-standard features, test certificates for each lighting standard, compliance certificate for the complete street lighting installation, and the provision of as-built information in RAMM (SLIM) format (refer schedule 3).

Add to existing list:

- (i) A stormwater management manual for all stormwater facilities. The manual is to include a maintenance schedule and details of the construction and operation system.

Document to include:

1. Contact details of maintenance personnel engaged and maintenance period.
2. Description of stormwater system and its operation (volume calculations and soakage rates, design and as-built plans of stormwater system to be appended to manual).
3. Compliance method and standards (if required).
4. Description of maintenance procedures and details of specific maintenance tasks.
5. Description of remedial actions to be undertaken by contractors including procedure for the disposal of materials if an inspection requires that material be removed.
6. Measures to minimise risk of contaminants entering stormwater treatment and disposal system, and steps taken in the event of a spill (if appropriate).
7. Inspection forms and records.
8. Producer statement completed by design author confirming all stormwater facilities are constructed and operate as designed.
9. Actions required before Council take-over.

- (ii) A record of spray application for weed control.

Document to include:

1. Approved handler details, substances and/or classes and phases for which lifecycle handler is approved, that is, copy of approved handler's certificate.
2. Substance information, that is, unequivocal identification, quantity, any site-specific limitations and/or restrictions.
3. Manner of application, amount and date, location (site plan where appropriate).

- (iii) A maintenance manual for all landscaping and reserves including vegetated low-impact urban devices or products. The manual is to include a maintenance schedule.

Document to include:

1. Contact details of maintenance personnel engaged.
2. Description of maintenance procedures and details of specific maintenance tasks.
3. Compliance method and standards required (in consultation with Council).
4. Inspection forms and records.
5. Actions required before Council take-over.

- (b)** Where community or small-scale distributed, renewable energy-generating technologies are provided, the following documentation is required:

- ownership and responsibilities clearly defined with contact details for maintenance personnel engaged with maintenance period, description of maintenance procedures and details/ownership of specific maintenance tasks
- description of the system and its operation (calculations, design and as-built plans of system)
- compliance method and standards (where relevant), copy of Greater Wellington and/or network provider consents (if applicable)
- inspection forms and records

- producer statement completed by design author confirming all facilities are constructed and operate as designed.

13. **Clause 1.9.1 Uncompleted works**

Where in the opinion of the Council it is appropriate, the Council may approve uncompleted work subject to satisfactory bonds being arranged.

Bonds must be secured by an appropriate guarantee or be in cash and lodged with the Council. Where necessary bonds must be executed and registered.

Bond templates for an appropriate guarantee or for a cash bond are available from the Council.

The amount of any bond under paragraph 1.9.1.3 is 150% of the estimated value of the uncompleted work.

14. **Schedule 1D As-built plans**

The information given on as-built drawings shall be submitted electronically as a PDF and as one of the following:

- AutoCAD 2009.dwg
- AutoCAD 2009.dwg with ESRI Shapefile.shp if available, or
- DXF and Excel Spreadsheet if the above options are not available.

All as-built drawings shall be supplied in New Zealand Geodetic Datum 2000 coordinates (NZTM projection). If this is not possible, the projection used must be specified.

As-built features shall be contained within the minimum number of logically named layers in the DXF file. As-built drawings shall show north point, lot boundaries, lot numbers or property numbers (if available) and cite the RM number.

See paragraph 31 in Schedule 3 for specific as-built requirements for roads.

The Council's [Checklist for Submission of As-built Drawings](#) shall be provided with the as-built drawings. The checklist is available from Council.

15. **Additional requirements**

Reducing waste

When designing the development, consider ways in which waste can be reduced:

1. plan to reduce waste during demolition, e.g. minimise earthworks, reuse excavated material elsewhere
2. design to reduce waste during construction e.g. prescribe waste reduction as a condition of contract
3. select materials and products that reduce waste by selecting materials with minimum installation wastage rates
4. use materials with a high recycled content e.g. recycled concrete sub-base, foamed bitumen. Proposed recycled materials will need approval from the Council to ensure that environmental contamination does not occur
5. consider carbon accounting and reduction plans to identify the source and quantify significant greenhouse gas emissions, and plan to reduce carbon emissions over the whole lifecycle of the development.

Emergency works

If during development, any situation arises associated with the development whereby, in the opinion of the Council, public safety, the security of public or private property, or the operation of any public facility or ecological site is endangered, the developer shall immediately carry out such remedial measures as the Council requires to remove the danger. Any work so required shall be at the developer's expense.

If such emergency works are not immediately carried out, the Council may arrange for the necessary remedial work to be carried out and charge the developer the cost for carrying out the works.

Damage to existing roads, services and property

All damage to existing roads, services or private property, or any disturbance of survey boundary marks due to, or caused by, any new works shall be the liability of the developer. All damage must be repaired by the developer immediately following instructions from the Council. If such remedial works are not started within 24 hours, the Council may arrange for the necessary work to be carried out and charged to the developer. This provision includes the removal of mud and debris from existing roads

in the vicinity of the development. A daily removal of such debris may be necessary in the interests of traffic safety.

In any situation where the Council considers that damage to existing roads, services or private property constitutes a risk or potential risk to the safety of road users, pedestrians or other persons, the developer shall immediately repair the damage or otherwise abate the hazard or potential hazard.

Road contamination

Developers shall put in place measures to avoid transporting sediment or other contaminants on to public roads.

Safety

Temporary fencing and warning signs shall be erected in accordance with the health and safety plan to protect site personnel and the general public, particularly children, from all hazards associated with the development. All fences and warning signs shall comply with occupational, health and safety requirements.

Final valuations for the Council's asset register

An itemised schedule of quantities and costs shall be provided for those services and assets which are to vest in the Council.

Where the work has been built by an 'arm's length' contractor, the work schedule of prices which has been modified to represent the work as built, and complete with the market unit rates, will be considered a current market valuation.

Where the work has not been undertaken by an 'arm's length' contractor (i.e. by the developer's own staff), the valuation shall be provided by an independently qualified person in the form of a schedule of works as built, priced at current commercial market rates as assessed by the independently qualified person.

The Schedule shall take the following form:

Item description	Unit	Quantity	Rate \$/Unit	Amount \$

Easements

Easements are required over any rights of way, communal services where these pass through lots in subdivisions, and any stormwater secondary flow paths over private property. The Council may also require other easements.

Easements shall be shown on the land transfer title plan and documentation shall be prepared by solicitors at the developer's expense. Draft easement documentation will require Council approval.

'Stop work' notices

Any person or persons carrying out 'on-site' works as part of any Council-approved development project shall cease such work, or part thereof, immediately upon receipt of a written stop work notice specifying restrictions and issued by Council or an authorised agent.

The developer's representative shall have the right to appeal to the Infrastructure Group Manager to override or amend a stop work notice. A copy of the notice and associated correspondence shall be recorded on the Council's resource consent or project file. Work may start again when the Council advises in writing.

Survey requirements

Level datum

The level datum used in the Kāpiti Coast district is Wellington Datum 1953 (mean sea level), unless otherwise advised by Council. The source of the levels (the benchmark) must be stated on engineering drawings

Benchmarks

Establish a permanent benchmark where required by the Council as a condition of subdivision or as part of a project brief for capital works. Generally, a permanent benchmark will be required when, in the case of a subdivision, there is an extension to Council's sewer, water, stormwater or roading network resulting in a distance of more than 650m from an existing permanent benchmark.

Benchmarks must be accurate to +/- 10mm.

Obtain a stainless-steel washer with the unique benchmark number from the Council. Fix it by Ramset nail to a kerb, drainage structure or to another substantial concrete structure within the legal road or council reserve.

Provide the following documentation:

- a diagram showing the reduced level to three decimal places
- certification from a licensed cadastral or registered professional surveyor (a sample certificate is available from Council).

Vesting requirements

Every situation will be assessed on its merits.

It should be noted the Council does not take over control of on-site individual stormwater attenuation devices, that is, attenuation tanks and soak pits serving individual properties.

Separation of services

Separation of services shall be as per NZS 4404:2010 and will be strictly enforced.

SCHEDULE 2

Kāpiti Coast District Council

Altered requirements to

Section 2 NZS 4404:2010 Earthworks and geotechnical requirements

The Kāpiti Coast District Council has adopted Section 2 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 2.2.2** *Referenced documents*

NZS 6803:1999: Acoustics – Construction noise

2. **Clause 2.2.4** *Geotechnical requirements*

Add to existing paragraph:

(i) Set earthwork requirements, where no standard for earthworks is applicable to the project, to conform to Council requirements and to resource consent conditions (if any) that apply to the proposed development.

3. **Clause 2.3.3** *Landform selection*

Add to existing paragraph:

(vii) The provision of building platforms which take into account house orientation is recommended. House orientation is crucial when maximising opportunities for passive solar heating or solar heat gain avoidance, natural ventilation or daylighting throughout the year.

4. **Clause 2.3.7** *Erosion, sediment and dust control*

Add further clause:

2.3.7.3 Erosion and sediment control

Developers shall apply the appropriate recommended treatments outlined in the [Erosion and sediment control guide for land disturbing activities in the Wellington region](#) and [Small earthworks – Erosion and sediment control for small sites](#) (available from the Greater Wellington Regional Council).

An Erosion and Sediment Control Plan shall be prepared and shall include:

- contact details of personnel engaged in sediment and erosion control
- a description of any detention or control measures employed (including any supporting documentation and/or calculations)
- compliance standards (under consent conditions)
- a description of maintenance procedures and details of specific maintenance tasks together with frequency of occurrence
- a description of remedial actions to be undertaken by contractors, including procedure for the disposal of materials if an inspection requires that material be removed
- measures to protect Council's infrastructure and/or natural features (if appropriate)
- inspection forms and records.

Any damage sustained to existing Council infrastructure, or additional maintenance costs, directly attributed to or resulting from erosion or deposits of sediment from any development, shall be the full responsibility of the developer (at their cost) to make good to the satisfaction of the Council.

Add further clause:

2.3.7.4 Dust control

Should there be potential for wind-blown sand, soil or other material to be transported on to other properties, the developer shall erect suitable fabric fencing (sarlou cloth or similar) and/or take other mitigation measures acceptable to the Council, such as frequent watering or establishing suitable ground cover, to control any dust nuisance. Water for dust control shall not be sourced from the Council's potable water supply without the Council's agreement. A fee is likely to be charged for water used for this purpose.

5. **Clause 2.6.2** *As-built drawings for earthworks and subsoil drains*

This clause applies for all earthworks situations. Note also the as-built requirements in Schedule 1.

Add to existing clause:

The location and reduced level of all compaction test results shall be shown graphically on an earthworks plan.

Additional requirements

(i) Contaminated sites

Sites potentially known to be, or subsequently found to be, contaminated as a result of previous activities may require the services of a specialist environmental scientist for a site evaluation. The site history is fundamental as this will identify all past and present activities at the site that involved the storage, production, use, treatment or disposal of materials that could contaminate the site. If contaminating activities have or may have occurred, or if the history is incomplete, it may be necessary to undertake a sampling and analysis programme. It is important to ascertain, at an early stage, the extent of any contamination and gain a reasonably accurate picture of the clean-up needed to meet the required standards.

(j) Local conditions

The general topography and nature of the soils present within, or adjacent to, the subject site give an indication of areas that have previously slipped or had earthworks carried out, or where springs and under-runners may be present, or where seismic events are likely to affect earth-fills, slopes and liquefiable ground. If these conditions are encountered or are likely to be encountered, the services of a specialist geotechnical engineer may be required as these conditions must be taken into account in the design and construction of any development.

The level of investigation should be appropriate to the geomorphology of the site, the scale of the proposed development, the importance of the facilities planned for the site and the level of risk to people and buildings arising from structure failure.

The main objective of the site investigation is to identify all local conditions and natural hazards present within, or adjacent to, the subject site, any susceptible soil strata, determine its in-situ state and make recommendations for remedial measures for the avoidance or mitigation of the hazard and its consequences.

(k) Noise and vibration

The developer shall consider the effects of noise and vibration on the surrounding properties and take these into account in implementing any earthworks in accordance with the scale of the development.

Developers shall take all necessary precautions to minimise the effects of earth vibration during piling or compaction works and prevent any damage that may occur on adjoining properties.

Construction noise associated with any earthworks is to be in accordance with the New Zealand Standard for Construction Noise, NZS 6803:1999: Acoustics – Construction Noise.

(I) An Earthworks Management Plan (EMP) that addresses all potential adverse effects of the proposed earthworks shall be submitted with any consent application covering earthworks. As a minimum, the EMP will need to address at least the following matters:

- windblown soil
- sediment control and stormwater run-off
- maintenance of local drainage paths from adjoining properties
- progressive top soiling and re-vegetation immediately following completion of each stage of the works
- the control of noise, vibration and other construction-related effects
- a monitoring program for effects of the earthworks on and off site
- the discovery of an unrecorded archaeological site.

The Erosion and Sediment Control Plan shall be included with the EMP.

SCHEDULE 3

Kāpiti Coast District Council

Altered requirements to

Section 3 NZS 4404:2010 Roads

This section sets out Council's infrastructure design standards. Council's Construction Drawings and Specifications (CSDS), including the approved materials list, may differ from those presented in NZS 4404:2010. The CSDS sit outside this document as the ability for regular review must be preserved. The version available on Council's website therefore will be the sole controlled version of the CSDS. The onus is therefore on users to be familiar with and refer to the latest version of the CSDS.

The Kāpiti Coast District Council has adopted Section 3 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 3.2.2** *Related standards and guidelines*

Add the following standards and guidelines:

- NZS 6806:2010 Acoustics: Road traffic noise – new and altered roads
- AS/NZS 2890.1:2004 Parking facilities – Off-street parking
- AS/NZS 2890.6:2009 Off-street parking for people with disabilities
- SNZ HB 8630:2004 Tracks and outdoor visitor structures
- New Zealand Transport Agency's Pedestrian Planning and Design Guides

2. **Clause 3.2.4.2** *Link context*

Add to definition of 'Lane':

Can include local walkways, beach accesses and residential lanes

Add to definition of 'local road':

Can include significant walkways, and cycleways between local commercial and employment centres, and schools

3. **Clause 3.3.1** *Design requirements*

- Streetscape components shall be in accordance with the Council's [Streetscape Strategy and Guidelines](#), unless otherwise approved by Council.
- Pedestrian access ways and cycleways may also be required for connectivity purposes and in accordance with the Council's [Cycleways, Walkways and Bridlepaths Strategy](#).
- In developments where less than two parks are provided for each dwelling, or where there is a planned bus route as part of the consent (or by public bodies such as Greater Wellington), the carriageway width must be a minimum of 7.2m, unless otherwise approved by Council. Geometric road design must also accommodate the type and number of vehicle movements anticipated in the development, taking into account any widening required at horizontal curves, sight visibility and road safety requirements.

4. **Clause 3.3.3** *Pavement structural design*

Pavement depths shall be as established through use of the design documents, but the minimum pavement thickness shall be 300mm (with at least 150mm basecourse), unless otherwise approved by the Council.

The applicant shall state the design method used to derive the pavement design. The traffic volume, growth and type along with subgrade criteria used in the design shall also be stated to enable peer review.

The pavement design shall be submitted for approval, before pavement construction.

5. **Clause 3.3.3.2** *California bearing ratio tests*

Use of scala penetrometer tests to establish subgrade California bearing ratio (CBR) values, requires the specific approval of the Council. Correlation of scala penetrometer results to actual soaked CBR tests may be required.

6. **Clause 3.3.6** *Parking, passing and loading*

The Council has adopted the parking provisions set out in AS/NZS 2890.1:2004 for off-street parking and AS/NZS 2890.6:2009 for off-street parking for people with disabilities. This includes minimum standards for driveways where they are intended for parking.

7. **Clause 3.3.11.1 Footpaths and access ways**

Pedestrian access ways shall generally have a legal width of 6m, with a specifically designed formation width no less than 2.2m and boundary fences being no higher than 1.2m for those sections more than 10m from the road frontage.

Council may require wider footpaths where deemed necessary and appropriate.

8. **Clause 3.3.11.3 Footpath and cyclepath surfacing**

In some situations, the Council may accept other surfaces for cyclepaths than concrete and asphaltic concrete. It will consider consistency with the local transport infrastructure, path gradients, street lighting and drainage.

9. **Clause 3.3.11.4 Berms**

- (f) Provide landscape amenity including allowing adequate space for the planting of berm trees, generally a minimum distance of 2m between kerb and footpath but see clauses 7.3.4 and 7.3.5 of NZS 4404:2010.

10. **Clause 3.3.14 Road lighting**

The Council has adopted the lighting provisions set out in AS/NZS 1158.

Traffic route lighting shall be designed in accordance with AS/NZS 1158:2020 and the Council's [Standard Details & Specifications for Road Lighting Infrastructure](#).

Local roads, pedestrian areas, cycleways and paths in reserves lighting shall be designed in accordance with AS/NZS 1158.3.1:2020 *Road lighting — Pedestrian area (Category P) lighting*.

Appendix 1: Lighting Categories shows how the different categories identified in AS/NZS 1158 apply to Council roads.

The Council requires a street lighting design that is specific to the project, including confirmation (with supporting documentation) of its compliance or otherwise with the requirements of AS/NZS 1158, the schedule of maintenance to be adopted (e.g. the luminaire cleaning and lamp replacement intervals), and a cross-section drawing showing the proposed type of pole, air and luminaire.

The following shall be submitted for approval with the engineering drawings:

1. the existing and proposed electrical load of the street lighting circuits

2. the lighting design details including lighting standard and category that the scheme has been designed to meet, mounting height, upcast, maximum spacings, lux lighting drawing showing hot and/or dark spots, and any non-complying portions or exceptions
3. a lighting schedule.

A schedule shall be provided detailing the work required for each light, including:

- light manufacturer, model and optic used
- lamp manufacturer, type and wattage
- pole manufacturer and type
- mounting height
- off set
- any other equipment or work required to ensure a complete installation.

Note: For the avoidance of doubt, the manufacturer and model of the lamp columns to be approved by Council before ordering.

Street lighting in subdivisions where roads are to remain private must be metered, have a separate ICP, and be independent from Council assets. The maintenance, operation, renewal and supply of power to the lights remains the responsibility of the individual property owners on the road. Section 224 certification does not include the handover of assets on a private road to Council unless specifically negotiated and sought before seeking resource consent approval.

Council has completed LED replacement of all street lighting on local roads. All road-lighting infrastructure shall comply with Council's current standard details and should be LED unless otherwise approved by Council.

11. **Clause 3.3.15** *Bridges and culverts*

Add to existing paragraph:

- (g) Bridges over watercourses with recreation access on one or both ends shall provide barrier-free access for recreation users. This access may require extra facilities on the road or extra clearance height and/or width of the bridge.

- h) Any new bridges must be designed by a chartered professional engineer, comply with the Building Act and be approved by Council.

12. **Clause 3.3.16** *Private ways, private roads and other private accesses*

Add to the first paragraph:

Accesses shall be considered in the overall streetscape design and not compromise on-road parking.

13. **Clause 3.3.16.1** *Plan and gradient design*

Add a further paragraph:

Vehicle crossings shall not negatively impact the function of footpaths. Vehicle crossings shall be designed in such a way as to minimise alterations to footpath crossfalls and gradients. Refer to principles presented in New Zealand Transport Agency's *Pedestrian Planning and Design Guide* (section 14.11).

14. **Clause 3.3.16.3** *Pavement design*

- Amend the thickness of AC to read 30mm, rather than 25mm.
- Commercial and industrial pavement design life shall be a minimum of 25 years.
- Where chip seal is to be used, then a second coat shall be applied the following surfacing season (within 12 months) at the applicant's cost. This may be undertaken by the applicant, or by the applicant funding Council to undertake the second coat within the annual reseal contract. Maintenance of first coat chip seals to ensure a sound surface free of loose stone shall be undertaken by the applicant until the second coat is applied. Line marking reinstatement is included in the second coat requirement.
- A surface warrantee and maintenance period is to be provided by the developer for a period of no less than one year after construction of the second coat of chip seal.
- A surface treatment design shall be submitted for approval, before seal application.

15. **Clause 3.3.17** *Crossings*

Add further paragraph:

Vehicle crossings must be in accordance with the Council's standard drawings and accesses must be sealed for at least the first 6m within the site boundary.

16. **Clause 3.3.19.5 Swales**

Add further paragraphs:

Where conditions allow, low-impact design is the Council's preferred approach and shall be undertaken in accordance with the Council's [Low Impact Urban Design and Development Guideline](#). Other design guides may be acceptable and used where approved by the Council.

Swales should be offset at least 1m from the kerb or carriageway edge and should be separated by grass berm. There may be some circumstances where swales are unsuitable and Council may request that an alternative solution is submitted for Council approval.

Unless otherwise approved by Council, swales should be grass only, not rock lined, and capable of being mowed with a domestic push mower and weed eater.

17. **Clause 3.3.19.7 Sumps**

1. Half syphons, bubble-up or in-situ poured sumps are not permitted. Twin sumps are preferred to double sumps.
2. Enviropods are required to be installed where stormwater discharges to soak pits or a sensitive receiving environment. All enviropods must have stainless steel rims and frames with 200µm mesh bags.
3. Council's sump details differ from those presented in figures 3.9 to 3.14 (NZS 4404:2010). Construction specifications and standard drawings, including an approved materials list, are available from Council. The onus is on users to be familiar with, and refer to, the latest version. For the avoidance of doubt:
 - standard sumps to be pre-cast box and back blocks
 - in-steeper catchments, or where it is necessary to convey Q_{100} flows, Humes street catchpit or approved equivalent to be used
 - where required, splay catchpits are permitted.
4. Council's standard litter trap device to be fitted to all sumps where enviropods are not installed.

18. **Clause 3.3.19.7.3 Sump gratings**

Cycle-friendly sump grates shall be used on all sumps.

19. **Clause 3.4.2.3 Basecourse**

1. NZTA M/4, AP40, or NZTA Approved Regional Basecourse may be used for both connector/collector and local roads. The approved regional basecourse is as specified in NZTA M/4: 2006 Table 4 — Wellington 1 Greywacke. Any proposed variation from these materials, such as the use of stabilised metal-courses or materials that do not meet the specification, will require specific design and Council approval.
2. Add to existing paragraph:

or,

(c) Council-approved recycled materials provided it is equivalent or superior in performance to NZTA specified M/4 materials. Council approval of an alternative material does not convey approval in general and each proposal will be judged on its merits.
3. Add further paragraph:

Testing results confirming that the basecourse meets specification shall be provided to the Council before road surfacing.

20. **Clause 3.4.2.2 Sub-base**

The AP65 sub-base aggregate shall be well graded, all in crushed granular aggregate, free of non-mineral matter, 50% by weight shall be two (2) or more broken faces, shall meet all requirements of TNZ M/4 (except broken faces and grading) and the following grading requirements:

Sieve size (mm)	% Passing by weight
65	100
19	40-100
9.5	0-70
2.36	0-40
0.425	0-10

0.075	0-52
-------	------

Any proposed variation from these materials, such as the use of stabilised metal-courses or materials that do not meet the specification, will require specific design and Council's approval.

21. **Clause 3.4.3.1** *Acceptable surfacing materials*

- a. Add to existing acceptable surfacing options:
 - (f) other sustainable materials – permeable paving, gridlock rubber matting, and cold asphalt with the approval of the Council.
- b. Where friction course is used, then the underlying waterproof surface shall be an asphaltic concrete of 30mm or greater and a membrane seal. Membrane seal design to be submitted. Minimum membrane seal (1.4 l/m² residual@15deg C and grade 4 chip).
- c. The two-coat (wet lock) – grade 3/5 or grade 4/6 – as set out in clause 3.4.4.2 is required where chip sealing is undertaken.

22. **Clause 3.4.3.2** *Road surface tolerances and texture*

The average roughness over the project is no greater than 70 NAASRA (count/km) and no individual reading shall exceed a maximum of 80 NAASRA for chip seals. The NAAARA readings are to be determined from the Quarter Car Lane IRI calculated over a 100m section, converted to NAASRA by New Zealand Transport Agency's conversion factor.

For structural asphaltic concrete or other bituminous surfacing, the average and maximum 100m lane roughness requirements are to be reduced to 50 and 60 NAASRA counts/km respectively.

23. **Clause 3.4.4.3** *Hot laid asphaltic concrete surfacing*

As well as meeting the TNZ M10 requirements, the asphaltic concrete in the pavement, after completion of final rolling, shall have statistically $\geq 90\%$ of its area with not less than 3% or more than 6% total air voids. In addition, the entire area of asphaltic concrete shall have not less than 1.5% or more than 7.5% total air voids. Any sections of pavement that do not meet these requirements shall be removed and replaced with

material supplied and compacted to specification requirements by the developer at their own expense.

24. **Clause 3.4.10** *Basecourse preparation for surfacing*

The application of systemic (ground sterilising) agents must comply with the Environmental Protection Authority's (EPA's) current application standards and controls. Check with the manufacturer, distributor or the EPA if you are not sure of the product's classification and control regime.

25. **Clause 3.4.11** *Deflection testing before surfacing*

The Council requires Benkelman beam deflection testing before surfacing. The standards required are as set out in table 3.4 of NZS 4404:2010.

The Council may also require deflection testing on the subgrade. Tests shall be carried out at not less than 15.0m intervals on alternative lanes. It is anticipated that, in general, sub-grade deflections should be 4mm average and not exceed 6mm. Deflections in excess of 6mm shall require remediation of the sub-grade or the engineer will need to reassess the pavement design to ensure the maximum final pavement deflection is not exceeded.

26. **Clause 3.4.11** *Surfacing specification*

Asphaltic concrete specification reference shall be amended to read M10, not P9.

27. **Clause 3.4.14** *Footpaths and cyclepaths*

(a) Recycled materials may be used as a foundation for footpaths once approved by Council.

(b) Tactile pads are required at pedestrian kerb crossings. The following documents shall be referenced:

[RTS 14](#)

[NZTA Pedestrian Planning and Design Guide](#)

(c) The Council may require footpaths to be reinforced where they are adjacent to mountable kerbs.

28. **Clause 3.4.15** *Kerbs*

- (a) Clegg testing must be undertaken on kerb pads and a reading of 30 or greater must be achieved before starting kerb construction.
- (b) Stormwater kerb outlets shall be constructed of galvanised steel or stainless steel.

29. **Clause 3.4.16** *Berms and landscaping*

- Amend the topsoil depth in the first paragraph from 100mm to 150mm.
- The seed mixture shall be: 85% drought-tolerant, amenity turf ryegrass 15% red fescue.

Other mixtures may only be used on the specific approval of the Council.

30. **Clause 3.4.18** *Progress inspections*

As a minimum the following inspections are required:

- Subgrade, before placing of subbase
- Subbase before placement of basecourse
- Benkelman beam testing
- Basecourse before surfacing
- During or immediately after surfacing.

31. **Clause 3.4.20** *As-built and completion documentation*

Add new paragraphs:

The as-built records for the tabulated asset types, using pocket RAMM, shall be loaded into Council's RAMM database for all roads vested in Council.

Practitioners able to undertake this work are to be suitably trained and competent in data capture and database entry. Request for permission for access to the database is to be made through the Council's Access and Transport team.

The approved practitioner shall:

- create/update centreline and carriageway details. Confirmation by Council's Access and Transport team is required before proceeding to asset data entry. Road name(s) will be provided by Council once approved

- add pavement and surfacing details. Attach the pavement and surfacing designs, along with applicable test results
- add linear and point data such as drainage, surface water channels, footpaths, signs, railings, markings, lighting, traffic lights, bridges, retaining walls and other general features
- attach applicable details and images.

The practitioner may use traditional route location, GSP positioning (Pocket RAMM) or underlay survey as-built information to define the location and shape of assets. Council's preference is for polylines and polygons to be used in map view to improve the overall fit of the data.

New subdivision roads will not be accepted by the Council as publicly maintained assets until all the as-built information has been approved.

C3.4.20

Kāpiti Coast District Council, as with most other New Zealand controlling authorities, uses the Road Assessment and Maintenance Management (RAMM) software package to record road feature information. It is important that assets are recorded in this way to enable funding from central government for road improvements and maintenance. All roads within new developments that are to be vested and maintained by the Council must be included in the RAMM database. This ensures the Council applies for the correct amount of government maintenance funding in the future. Funding from central government removes some of the financial burden for road maintenance from local rate players, thus it is important that the database is up to date.

32. Additional requirements

- (i) Work undertaken on Council-owned roads shall be undertaken in accordance with the *National Code of Practice for Utility Operators' Access to Transport*

Corridors, including appropriate procedures outlined in the Code, unless otherwise required in [Kāpiti Coast District Council Local Conditions](#).

The Council may require the arrangement of bonds to cover work being undertaken within existing roads. The amount of the bond shall be Council's estimate of the value of the works undertaken in road reserve and held to cover the costs incurred by the Council in the event of default or prolonged opening. The bond shall be released upon Council being satisfied with the practical completion of the road opening.

- (ii) Retaining walls must not be on a legal road or other Council land unless they are approved by Council or are specifically required to support Council assets once approved.
- (iii) Any retaining wall or structure on public land approved by Council that is to support private development must be constructed, maintained and insured at the expense of the landowner not Council.
- (iv) Retaining walls to support assets will only be considered where other suitable earthworks solutions have been exhausted.
- (v) Permeable pavements may be considered where water table levels and soil conditions allow. Specific design of the pavement shall be provided to the Council for approval.
- (vi) Any developments over 10 dwellings must have the vehicle access designed as an intersection, and not a driveway, unless otherwise approved by Council.
- (vii) The placement of utility service chambers should be outside of trafficked areas, including vehicle crossings, and be placed in the berm unless otherwise approved by Council.
- (viii) Swept paths diagrams must be on auto track by approved software users and not be based on stationary steering.
- (ix) Waste: As all collection trucks are now automated, arm-lift vehicles, road width and parked vehicles can impact directly on their ability to get close enough to align with a bin to lift and empty it safely. Therefore, developments should ensure enough provision to allow all bins to be placed so they can be emptied from the left.

Developers will need to contact waste collection operators in Kāpiti to understand the operational requirements relevant to the design of their development proposal.

Weed control

Before final handover to the Council, the developer shall undertake weed spraying as follows:

- In urban roads, the developer shall spray weeds, grass and other growth over or within berms, kerb and channel; along the edge between the carriageway and channel; on footpaths; around service openings such as fire hydrants, sumps and valves; and around the base of poles, road signs and structures.
- In unkerbed streets and rural roads, the developer shall spray weeds, grass and other growth over or within metalled shoulders and paths; along the edge between sealed surface and metal shoulder; water tables; side drains; culverts; and the base of roadside furniture such as signs, marker posts, chevrons and poles.
- Application of pesticides must comply with the EPA's current application standards and controls. Check with the manufacturer, distributor or the EPA if you are not sure of the product's classification and control regime.

Waste

Developments should comply with Council bylaws and be capable of accommodating a 10m rubbish vehicle. Design of development should take account of:

- the need for widening on horizontal curves to accommodate rubbish trucks
- demonstration that the site can accommodate rubbish trucks using swept-path analysis
- the location of parking or any obstacles or geometric design that may impede collection
- sight visibility for oncoming traffic, particularly around corners
- road safety
- the Building Act requirements

Land Development Minimum Requirements

- provision of appropriate bin storage facilities inside and outside buildings, and the ability to easily collect from them, either on the property or at a designated collection point within the site
- Council's guidelines for medium-density housing and the waste calculator.

Schedule 3 Appendix 1: Lighting categories

Network hierarchy descriptor	Road names	Land use type	Lighting category
Major community connector routes	Mill Road	Urban	V4
	Riverbank Road	Urban – Industrial	V4
	Otaki River Walkway	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Otaki Forks Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Te Moana Road (to Rauparaha Street)	Urban	V4
	Elizabeth Street (from Seddon Street east)	Urban	V4
	Waikanae River – Walkway	Urban	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Reikorangi Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Akatarawa Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Kāpiti Road	Urban	V3/V4
	Mazengarb Road	Urban	V4
	Arawhata Road	Urban	V4
	Raumati Road	Urban	V4
	Ihakara Street	Urban	V4
	Wharemauku Stream – Walkway	Urban	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Rosetta Road	Urban	V4
	Marine Parade	Urban	V4
	Mataua Road	Urban	V4
	Wharemauku Road	Urban	V4

Land Development Minimum Requirements

	Poplar Avenue	Urban	V4
	Kāpiti Coastal Cycleway – Walkway	Urban/Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
Local community connector	Tasman Road	Rural	Generally, not required in rural area. Council considers urban area on case-by-case basis dependent on size of subdivision – V4
	Rangiuru Road	Rural	Generally, not required in rural area. Council considers urban area on case-by-case basis dependent on size of subdivision – V4
	Aotaki Street	Rural	Generally, not required in rural area. Council considers urban area on case-by-case basis dependent on size of subdivision.
	Te Horo Beach Road	Rural	Generally, not required in rural area. Council considers urban area on case-by-case basis dependent on size of subdivision.
	Old Hautere Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Morrison Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Peka Peka Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Paetawa Road	Rural	Generally, not required. Council considers each on case-by-case basis dependent on size of subdivision.
	Rutherford Drive	Urban	V4
	Te Moana Road (from Rauparaha Street)	Urban	V4

Network hierarchy descriptor	Road names	Land use type	Lighting category
Local Community Connector (cont.)	Waimea Road (Te Moana Road to Weggery Drive)	Urban	V4
	Weggery Drive	Urban	V4
	Queens Road (to Eruini Street)	Urban	V4
	Eruini Street	Urban	V4
	Tutere Street (Eruini Street to Te Moana Road)	Urban	V3
	Park Avenue	Urban	V4

Land Development Minimum Requirements

	Ngarara Road (Te Moana Road to Rimu Street)	Urban	V3
	Rimu Road	Urban	V3
	Miro Street, Waikanae	Urban	V3
	Ngaio Road (Omahi Street to Miro Street)	Urban	V3
	Wellington Road	Urban	V4
	HillCrest Road	Urban	V3
	Menin Road	Urban	V3
	Te Roto Drive	Urban	V4
	Guildford Drive	Urban	V4
Centre connector	Kāpiti Road (SH1 to Rimu Road)	Urban	V3
	Rimu Road	Urban	V3
	Main Street, Otaki	Urban	V3
	Matene Street	Urban	V3
	Aotaki Street (Rangatira Road to Main Street)	Urban	V3
	Rangatira Road	Urban	V3
	Rangiuru Road	Urban	V4
	Beach Road (SH1 to Wellington Road)	Urban	V3
	Raumati Road (Hillcrest Road to Rosetta Road)	Urban	V3
	Rosetta Road (front of Raumati Gardens open space)	Urban	V3
	Marae Lane	Urban	V3
	Ngaio Road (Omahi Street to SH1)	Urban	V3
	Elizabeth Street (SH1 to Seddon Street)	Urban	V3
	Pehi Kupe Street	Urban	V3 / V4
	Howell Road	Urban	V3
	Maclean Street	Urban	V3
	Seaview Road (Howell Road to Maclean Street)	Urban	V3

Land Development Minimum Requirements

--	--	--	--

Network hierarchy descriptor	Road names	Land use type	Lighting category
Neighbourhood access route and private roads	Typically, residential streets not listed above.	Urban	Generally, P3 / P4 for Neighbourhood access routes as agreed with the Council at resource consent stage. Site-specific considerations will apply but V3 / V4 may also be required on private roads that would fall into a different hierarchy class if vested.
		Rural	Typically, not required, but this will be reviewed on a case-by-case basis and could include flag lighting.

Notes:

This table is intended to be an indicative guide only as new roads will be added to, and some may be reassigned in the hierarchy, in the network. Some rural roads may not require lighting.

Columns, gear trays and lamps must be approved by Kāpiti Coast District Council Road Asset Team. These are limited in design to ensure maintenance and renewal costs can be covered within existing LTP budgets.

In selecting suitable infrastructure, LTP Key Performance Indicators on energy consumption will be taken into consideration in the final design selection.

SCHEDULE 4

Kāpiti Coast District Council

Altered requirements to

Section 4 NZS 4404:2010, Stormwater

This section sets out Council's infrastructure design standards. Council's Construction Drawings and Specifications (CSDS), including the approved materials list, may differ from those presented in NZS 4404:2010. The CSDS sit outside this document as the ability for regular review must be preserved. The version available on Council's website therefore will be the sole controlled version of the CSDS. The onus is therefore on users to be familiar with and refer to the latest version of the CSDS.

The Kāpiti Coast District Council has adopted Section 4 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 4.2.4** *Catchment management planning*

Replace existing third paragraph with:

The implications of future development on adjoining land should be on the basis of replicating the pre-development hydrological regime for the 50%, 20%, 10%, 2% and 1% AEP design storm, whereby the maximum rate of discharge and peak flood levels post-development are no greater than pre-development.

2. **Clause 4.2.9** *Climate change*

2090 climate-affected isohyet maps providing climate-adjusted rainfall depths are included in *Appendix 1, Isohyet Based Calculation of Design Peakflows, Isohyet Guidelines*.

3. **Clause 4.3.4** *System design*

See Part 3, Section E (vi), Design principles, of this document for design requirements.

4. **Clause 4.3.4.2** *Secondary systems*

Replace existing third paragraph with:

Ponding or secondary flow on local roads shall be limited to a 200mm maximum height at the centre line and velocity such that the carriageway is passable in a 1% AEP design storm.

5. **Clause 4.3.5** *Design criteria*

The primary method for the design of stormwater systems shall be based on the isohyet (rainfall depths) charts produced by the Council for the Kāpiti District or NIWA's HIRDS (high intensity rainfall design system) V4 rainfall information as an alternative to Isohyet (rainfall depths) charts. Isohyet (rainfall depths) charts, and guidelines for their use, are included as Appendix 1 to this Schedule. The methods outlined in NZS 4404:2010 may be used, at the Council's discretion, for small-scale situations. In these cases, rainfall intensities shall be derived from the rainfall depth charts and the 24-hour distribution table in the guidelines.

6. **Clause 4.3.5.2** *Freeboard*

Replace existing clause with:

Risk and sensitivity analysis should dictate minimum freeboard height additional to the computed top water flood level of the 1% AEP design storm applied in a given situation rather than solely the nature of the development. Larger freeboards should be used for major catchments or when storm surge is a possibility.

Minimum freeboard height varies across the district and the applicant should consult with Council staff to determine the minimum freeboard height on a locality basis.

Generally, the minimum freeboard heights vary from 0.3m to 1.0m.

The minimum freeboard shall be measured from the top water level to the building platform level or the underside of the floor joists or underside of the floor slab, whichever is applicable.

7. **Clause 4.3.5.3** *Tidal areas*

The Council should be consulted on any coastal hazard considerations.

8. **Clause 4.3.6** *Stormwater pumping*

In general, the Council will not approve pumping of stormwater for new developments.

9. **Clause 4.3.7** *Low-impact design*

Low-impact design is the Council's preferred approach (where appropriate) and shall be undertaken in accordance with the Council's [Low Impact Urban Design and Development](#)

[Stormwater Guidelines](#). Other design guides may be acceptable and used where approved by the Council.

10. **Clause 4.3.7.6** *Vegetated swales*

Add to existing paragraph:

- (h) Species to be planted – consideration to be given to hydro-seed or hydro-mulch application
- (i) Measures required to protect the integrity and/or functionality of the swale while vegetation establishes.

11. **Clause 4.3.7.8** *Rainwater tanks*

See the Kāpiti Coast [Rainwater and Greywater Code of Practice](#) (2012) for specific requirements for rainwater tanks.

The Council has a tank calculator for determining the size of tank and outlet orifice size when used for attenuation purposes.

12. **Clause 4.3.7.9** *Soakage devices*

The Council considers 0.25 (a safety factor of 4) to be an appropriate reduction factor to be applied to the rate of soakage determined through a soakage test.

Add further paragraphs:

The method outlined in NZBC clause E1/VM1 (2011) may be used. In these cases, rainfall intensities shall be derived from the rainfall depth charts and the 24-hour distribution table in Appendix 1 of this schedule.

In areas with satisfactory soakage, the Council requires on-site disposal through soak pits unless this may cause adverse effects.

The Council may require small diameter outlets from soak pits to control groundwater levels.

13. **Clause 4.3.9.1** *Location and alignment of public mains*

Easements are required for protection of public stormwater pipelines, which are located in private property, and shall be centred on the as-built position of the pipeline. The easement shall be a minimum of 2 times the depth of the pipe to invert plus the outside diameter of the pipe or 3m wide, whichever is greater. The easement shall provide unlimited and unrestricted access for the Council to undertake maintenance work.

In shared trench situations, the easement boundaries shall be a minimum of 1.5m from the outer services.

14. **Clause 4.3.9.2** *Materials*

Replace existing section with:

Construction specifications and standard drawings, including the approved materials list, are available from Council. The onus is on users to be familiar with, and refer to, the latest version.

15. **Clause 4.3.9.3** *Minimum pipe sizes*

Minimum pipe size for public mains is 300mm.

16. **Clause 4.3.9.4** *Minimum cover*

Minimum cover shall be no less than 500mm unless specifically designed.

17. **Clause 4.3.9.6** *Culverts*

Add paragraphs:

Council's preference is for single culverts or bridges not multi-cell culverts.

Culverts on watercourses with recreation access must not impede barrier-free access along the watercourse and must be specifically designed for fish passage. For more information refer to Greater Wellington's publication *Fish Passage in the Wellington Regions*.

The minimum culvert diameter shall be 450mm, unless otherwise approved by Council.

18. **Clause 4.3.9.8** *Outfall water levels*

Generally, outfall water levels will be determined from stormwater modelled results.

19. **Clause 4.3.11** *Connection to the public system*

Add to existing paragraph:

- (j) Where connection for a property is made to the kerb, or the overflow from a property's on-site disposal/attenuation system is made to a kerb, the kerb connector shall be either galvanised steel or stainless steel.

20. **Clause 4.4.2** *Information to be provided*

(a) The information requirements outlined in the first set of sub-paragraphs (a) to (e) and subparagraphs (f), (h) and (i) from the second set are to accompany resource consent applications. The other information requirements are generally required for plan and specification approvals but may be required for assessment of resource consent applications.

(b) The information is additional to any that is required under Parts 2 and 3 of this document.

21. **Clause 4.5.2 Trenching**

Council's details differ from those presented in Appendix B drawings CM-001 and CM002. Work undertaken in Council-owned roads shall be undertaken in accordance with the [National Code of Practice for Utility Operators' Access to Transport Corridors](#), unless otherwise required in the [Kāpiti Coast District Council Local Conditions](#) document.

22. **Clause 4.5.3 Reinstatement**

The requirement for reinstatement is included in Council's construction specifications, approved materials list and standard drawings (refer to the above for details).

23. **Clause 4.5.4 Inspection and acceptance**

Once the road surface is to finished level and before any road surfacing, the developer shall arrange for all public stormwater pipes of 1200mm diameter or less to be inspected by CCTV. The developer shall provide an electronic file and defects report to Council. The filming shall be done travelling upstream with a trickle of water flowing downstream to allow hollows and steps to be easily seen. All defects are to be fixed to the satisfaction of Council at the developer's cost. Where faults are found and repaired, Council may instruct the developer to re-film those lengths to ensure there are no further problems.

24. **Additional requirements**

1. Easements are required for protection of public stormwater pipelines, subsoil drains, waterways and secondary flow paths, when these are located in private property and shall be centred on the as-built position of the feature/pipe.

For pipes, the easement shall be a minimum of 2 times the depth of the pipe to invert plus the outside diameter of the pipe or 3m wide, whichever is greater. The easement shall provide unlimited and unrestricted access for the Council to undertake maintenance work. In shared trench situations, the easement boundaries shall be a minimum of 1.5m from the outer services.

Easements associated with the waterways or open drains, attenuation or disposal areas, and secondary overflow paths shall provide enough room for a mechanical excavator and truck to gain unlimited and unrestricted vehicular access to undertake maintenance work.

2. Work undertaken on Council-owned roads shall be undertaken in accordance with the [*National Code of Practice for Utility Operators' Access to Transport Corridors*](#), including appropriate procedures outlined in the Code, unless otherwise required in the [*Kāpiti Coast District Council Local Conditions*](#) document.

Updated Isohyet Based Calculation of Design Peakflows

UPDATED ISOHYET BASED CALCULATION OF DESIGN PEAKFLOWS

Final

11 October 2011

-
- Sinclair Knight Merz
 - Level 3, 86 Customhouse Quay,
PO Box 10-283
Wellington, New Zealand
 - Tel: +64 4473 4265
 - Fax: +64 4473 3369
 - Web: www.skmconsulting.com

COPYRIGHT: The concepts and information contained in this document are the property of Sinclair Knight Merz Limited. Use or copying of this document in whole or in part without the written permission of Sinclair Knight Merz constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of Sinclair Knight Merz Limited's Client, and is subject to and issued in connection with the provisions of the agreement between Sinclair Knight Merz and its Client. Sinclair Knight Merz accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

The SKM logo trade mark is a registered trade mark of Sinclair Knight Merz Pty Ltd.

Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Final	12/10/2011	BF	BF	12/10/2011	Final

Distribution of copies

Revision	Copy no	Quantity	Issued to
Final	1	1	KCDC

Printed:	22 August 2012
Last saved:	22 August 2012 10:32 AM
File name:	Document1
Author:	Tony Trueman
Project manager:	Tony Trueman
Name of organisation:	Kāpiti Coast District Council
Name of project:	Updated Isohyet Based Calculation of Design Peakflows Updated
Name of document:	Isohyet Based Calculation of Design Peakflows
Document version:	Final
Project number:	AE04131

Contents: Schedule 4 Appendix 1

1. Introduction	128
2. Background	129
3. Haestad's Graphical Hec-113	136
4. US Army Corps Engineers HEC-HMS	139
5. Model Limitations	144
6. Worked Example	145
7. References	152
Appendix A: Rainfall Recurrence Isohyet Maps	154
Appendix B : Curve Number Delineation Tables	167
Appendix C: Time of Concentration Calculations	172

Tables

Table 1-1: Growth factor for Paraparaumu Airport rainfall based on NIWA's 2090 mid-range temperature climate change scenario	128
Table 2-1: Normalised Depth-Duration Relationship for 24-hour Rainfall	131
Table 6-1: Normalised Depth-Duration Relationship for 24-hour Rainfall	147
Table 2-2a: Runoff curve numbers for urban areas (SCS, 1986)	167
Table 2-2b: Runoff curve numbers cultivated agricultural lands (SCS, 1986)	169
Table 2-2c: Runoff curve numbers for other agricultural lands (SCS, 1986)	170
Table 2-2d: Runoff curve numbers for arid and semi-arid rangelands	171

Figures

Figure 2-1: Annual Maxima Rainfall Station	129
Figure 2-2: Storage/Concentration Time Ratio Curves (Hoggan, 1996)	135
Figure 6-1: Site Plan for Example Catchment	146
Figure 6-2: Catchment Location on the 10-Year Isohyet Plan	146
Figure 6-3: Rainfall depths applied for the 10-Year Example	147
Figure 6-4: Geology of the Given Catchment Area	148
Figure 6-5: Loss Rate Factors Applied for the 10 Year Example	149
Figure 6-6: Concentration Times and Storage Values Applied for the 10-Year Example	151
Figure 6-7: Output Hydrograph from 10-Year Example	151
Figure 6-8: 10-Year Rainfall Intensity Curve for the Example Catchment	152

1. Introduction

As part of Kāpiti Coast District Council’s subdivisional and development requirements, Sinclair Knight Merz have been engaged by the Council to prepare a standard for the calculation of stormwater design flows on the Kāpiti Coast.

This report is an update of the 2003 Sinclair Knight Merz report titled ‘*Isohyet Based Calculation of Design Peakflows*’. While the methodology remains unchanged this update includes the revised isohyets plans that were developed in the report ‘*Update of Kāpiti Coast Hydrometric Analysis, 2008, SKM*’.

These plans incorporate the predicted impacts of climate change into the Kāpiti Coast hydrometric analysis. The predicted 2090 mid-range temperature scenario was used to estimate the climate change rainfall growth factor to 2090. This growth factor was used to produce a second set of isohyet maps. In 2008 the predicted effects of climate change on the Kāpiti Coast District are an increase in rainfall by between 8 and 16% over the 2- to 100-year ARI events.

Table 1-1. Growth factor for Paraparaumu Airport rainfall based on NIWA’s 2090 mid-range temperature climate change scenario

Average Recurrence Interval (years)	2	5	10	20	50	100
2090 Climate Change Growth Factor	1.08	1.10	1.12	1.14	1.16	1.16

Note: The 5-year result was not included in the NIWA report, so has been interpolated from the data.

In this report the unit hydrograph-based approach is modelled on the US Soil Conservation Service software HEC-1. This approach has been internationally recognised and is widely used throughout the world. Haestad’s HEC-1 and HEC-HMS are unsupported ‘freeware’ versions available through the US Army Corps of Engineers website. Support is available to subscribers through the Bentley software provider.

These guidelines provide examples on how to produce design hydrographs using both of the aforementioned versions of the software.

Unit hydrograph modelling is widely used for the development of floodplain management plans, and has been used for this purpose in Kāpiti since the early 1990’s. This method of developing runoff design flows is also being widely used throughout New Zealand and is the basis of the Auckland Regional Councils rainfall-runoff guidelines ‘TP-108’.

Further discussion of this analysis is covered by the document '*Update of Kāpiti Coast Hydrometric Analysis, 2008, SKM*'. A generalised logistic distribution was adopted for the Regional Analysis.

Rainfall recurrence isohyet maps have been generated for the 2, 5, 10, 20, 50 and 100-year ARI rainfall depths and for the predicted impacts of climate change, using kriging geostatistical techniques. The respective maps are appended at the rear of this report as Appendix A.

2.2 *Clark Unit Hydrograph using the SCS Curve Numbers*

The unit hydrograph method of flood estimation was first proposed by Sherman and has since found wide application for both design and estimation of actual floods where a hydrograph and reasonable accuracy are required (Maidment, 1992).

Unit Hydrographs are defined by the runoff resulting from uniform units of rainfall depth over an entire catchment. The difference between rainfall volumes and runoff volumes in the unit hydrograph model is expressed as losses to the system, which can relate to a variety of forms such as evapo-transpiration, and storage within vegetation, the soil, and undrained depressions.

The key components for the development of a unit hydrograph model are therefore rainfall depth relationships, rainfall losses, and catchment characteristics. Each of these items have been separately discussed through the remainder of this chapter and are covered considerably more comprehensively in Hoggan (1996).

2.2.1 **Rainfall Depth Relationships**

A 24 hour balanced storm has been proposed for general use. A long-balanced storm of this nature is commonly used for floodplain management based work and allows for storage volumes to be more accurately assessed for low impact design storage based solutions.

The balanced storm approach 'nests' high intensity rainfall events within the 24-hour storm profile. This allows for peak estimates of flow to be accurate for small catchments while also providing an appropriate assessment of larger storage volume issues.

A symmetrical distribution has been applied in this case so that the peak rainfall intensities will fall across the midpoint of the storm.

24-hour rainfall depths for any catchment can be estimated for the 2, 5, 10, 20, 50 and 100 year annual recurrence interval (ARI) events and for the predicted impacts of climate change using the 24 hour isohyets maps attached as Appendix A. For larger catchments weighted averages can be calculated, or the catchment can be split up and modelled as a series of sub-catchments.

Once 24-hour rainfall depths have been defined, these have to be converted into some form that allows a balanced storm to be developed in Graphical HEC, or HEC-HMS. For

both of these software packages a normalised depth-duration-frequency relationship can be multiplied by the 24-hour total depths to provide duration-depth data. The normalised rainfall depth-duration relationship is shown in table 2-1.

Table 2-1: Normalised Depth-Duration Relationship for 24-hour Rainfall

Duration	Normalised Rainfall Depth (I/I_{24})
5 Mins	0.08
15 Mins	0.14
1 Hour	0.26
2 Hour	0.38
3 Hour	0.46
6 Hour	0.60
12 Hour	0.81
24 Hour	1

Computed duration depths can be entered directly into Graphical HEC or HEC-HMS as a balanced storm as will be explained in chapter 3 and 4.

The normalised rainfall depth relationship has been developed using the Paraparaumu Aerodrome rainfall record. This provides the longest record of continuous (as opposed to daily read) data in the region with 48 years record.

2.2.2 Rainfall-Runoff Losses

One of the advantages of the SCS method of unit hydrograph modelling is that it provides a system for the delineation of rainfall losses over the period of the storm based on a catchments soil, and land-use characteristics. These curves, unlike linear losses across a storm, allow for antecedent storage to impact the shape of the storm profile. This reflects reality where greater rainfall losses would be expected through the earlier portions of the storm.

The SCS loss method is defined by the following equations (Hoggan, 1996).

$$Q = \frac{(P - I_a)^2}{P - I_a + S}$$

$$S = \frac{1000}{CN} - 10$$

Where³

Q = accumulated Runoff (mm)

P = accumulated Rainfall (mm)

I_a = initial Abstraction

S = potential maximum retention after runoff begins (mm)

CN = curve number, percent of runoff

2.2.2.1 Initial Abstraction

Initial abstraction is approximated by the empirical equation $I_a = 0.2S$ as the default parameter of the SCS model. Initial abstraction has been found to be less than this in studies completed within the Kāpiti Coast however. Work completed for a Masters thesis confirmed that for storms in the order of an annual flood, I_a values fluctuated between 0 and 4mm (Watts, 2002). This corroborates the results of TP108 (Beca Carter, 1999), which suggests initial abstraction values of 5mm for pervious areas and 0mm for impervious.

Our suggestion is that for fully urbanised catchments I_a values of 0mm be used, and small rural catchments 5mm is used. No data is available for larger catchments, but this is one area where further work could be done with available data.

2.2.2.2 Delineation of Curve Numbers

Curve numbers (CN's) define the volume of storage losses for any modelled rainfall event. These values can be delineated from a standard set of runoff curve tables that were developed by the US Soil Conservation Service. These tables, (Appendix B), allow for a variety of differing land uses, including urban land, for a range of differing soil types.

As these tables allow for the analysis of a wide variety of land uses and soil types previous work completed in the Kāpiti Coast District has identified base CN values that encompass most of the soil types typically found in the region. A summary table of typical CN values (based on Connell Wagner, 2001) is as follows:

³) ¹ TP-108, ARC 1999

Updated Isohyet Based Calculation of Design Peakflows

Soil Type	Curve Number
1. Loose Dune Sands Assumed soil type A.	45
2. Gravel Silt Loams Pasture Urban Gardens* Bush Assumes soil type B. In some cases testing will show gravel soils to have higher infiltration capacities than this in which case soil type A should be assumed.	69 61 48
3. Residential Inland Dune sands Assumes soil type B and accounts for construction compactions.	61
4. Greywacke Argillite Steepland Soils Pasture Urban* Bush	79 74 65

* Excludes connected impervious areas as covered in section 2.2.3.

This table is intended as guidance and should not substitute formal ground investigation in cases of uncertain soil conditions.

2.2.3 Catchment Characteristics

A variety of catchment characteristics need to be defined for the development of the Clarke's unit hydrograph. These include

An assessment of soils for development of the Curve Numbers covered above.

An assessment of Connected Impervious Areas.

The nature of catchment Storage.

Calculating the Time of Concentration

2.2.3.1 Soils Categories

CN tables, as covered in Appendix B, identify the substantial impact of soils properties on total runoff volumes. Soils are assessed under four categories (TP108, 1999) as follows:

Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission (greater than 8mm/h).

Loose dune sands would typically fall within the Group A soil category, and well drained gravels would also fall within this category.

Group B soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well drained to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (4-8mm/h).

Inland compacted sands, less well drained gravel loams and valley-based gravel loams would typically fall within this soil group.

Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (1-4mm/h).

Most of the steepland argillite, greywacke and loess-based soils would fall into this category.

Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils and a permanent high-water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0-1mm/h). Existing peat bogs may fall into this category.

2.2.3.2 Connected Impervious Areas

Connected impervious areas are recorded as a percentage of the residential zone that is impervious, and directly connected via formal drainage systems to the receiving waterway. A previous assessment of current land-use (Connell Wagner, 2001), gave Connected impervious values of

Residential A – older lots 800m ² average	38% CIA
Residential B – newer lots 600m ² average	55% CIA
Residential C – retirement villages	65% CIA
Industrial	72% CIA
Commercial	85% CIA
Road Designation	36% CIA
Town Centre (Paraparaumu)	50% CIA
Educational	72% CIA

Hospital	72% CIA
Open Space/Rural Zone	0% CIA

2.2.3.3 Storage Values

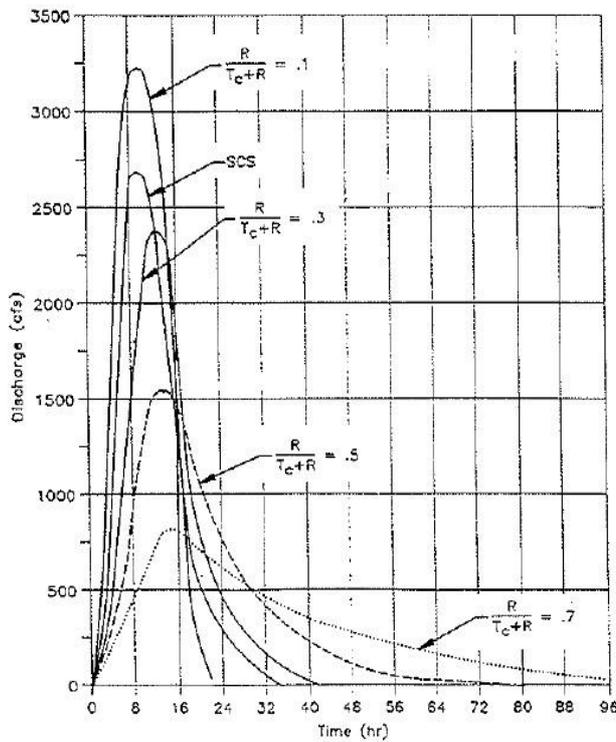
Storage volumes for any one event are defined by the given CN. The shape of the volume outflow in the Clarke's unit hydrograph is determined by the storage coefficient R. The value R is interdependent of the concentration time and can be given as

$R = T_c \cdot \text{Ratio} / (1 - \text{Ratio})$ Where the ratio represents the shape of a given hydrograph as shown in figure 2-2.

In this situation the concentration time becomes the control of R given a set ratio of runoff. This is seen as a distinct advantage as although some work has been undertaken in an attempt to quantify R in the Kāpiti Region, (Watts, 2001, Connell Wagner, 1999), this work has not been conclusive, and has provided a wide variety of results.

Using the runoff ratio approach, ratios can be set for differing landuse types to control the runoff hydrograph shape. These can be applied for any given time of concentration to provide a value for R that can be entered into the hydrograph equation.

Figure 2-2: Storage/Concentration Time Ratio Curves (Hoggan, 1996)



From previous work undertaken by Connell Wagner, (2001), appropriate ratios for R have been defined as:

- 0.25 for highly developed industrial commercial catchments
- 0.30 for most residential catchments
- 0.35 for high storage residential catchments
- 0.45 for rural steepland catchments.
- 0.60 for rural flatland catchments.

A more detailed discussion of the calculation of storage coefficients, and indeed all of the above SCS parameters, is covered in Hoggan, 1996. This is an excellent background text for the engineering hydrologist.

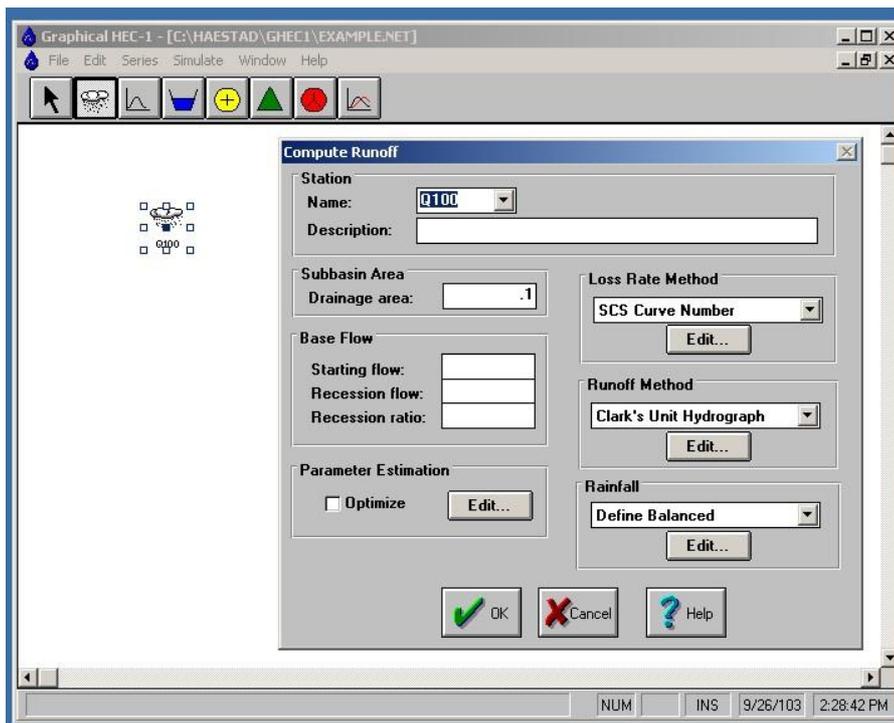
2.2.3.4 Concentration Times

Times of concentration should be calculated in accordance with the requirements for subdivision and development. An example calculation of concentration times is covered in section 6.4 of this report.

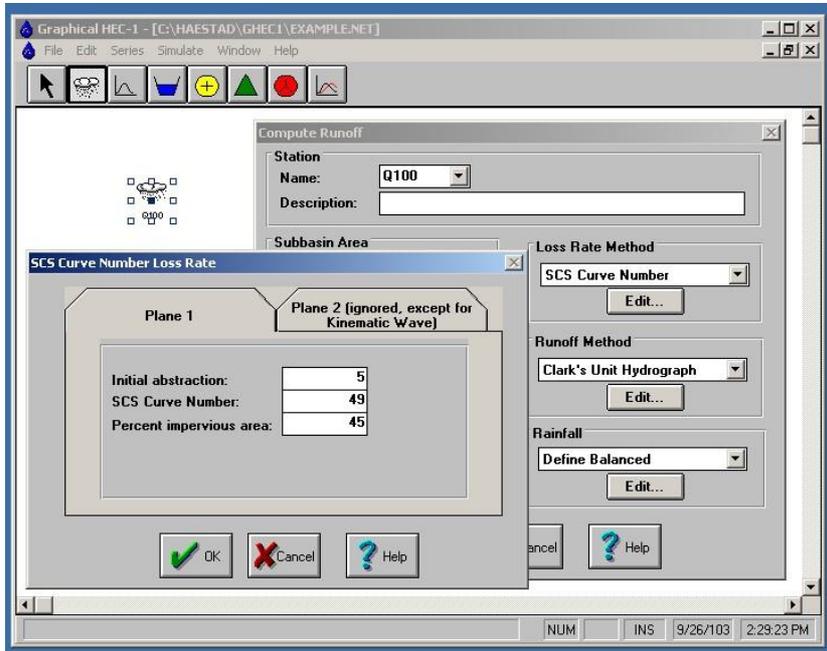
3. Haestad's Graphical Hec-1

Haestad's are an American software company that have taken the proprietary HEC 'freeware' and developed a windows front end that is both easy to use and backed up by full software support currently provided by Bentley.

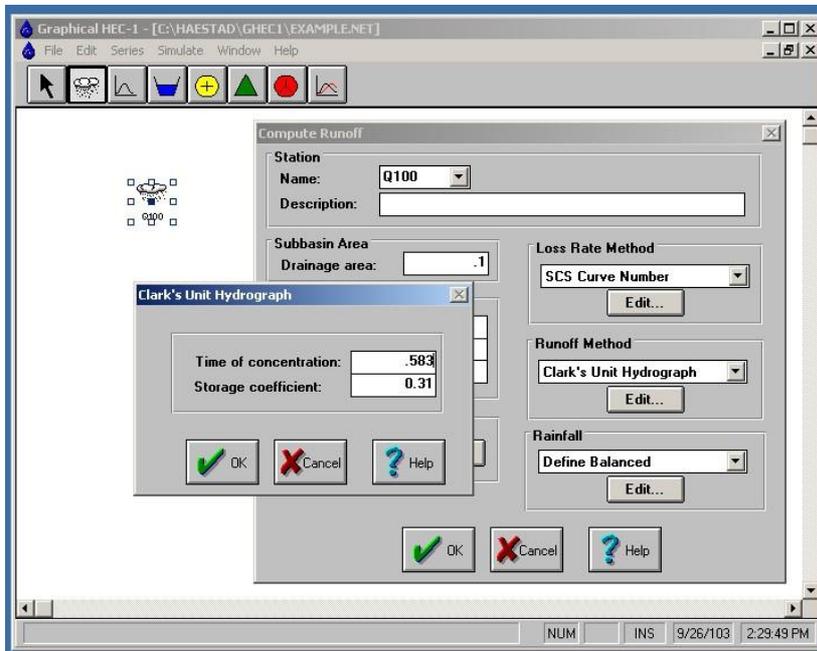
To develop an SCS hydrograph using the information from the previous chapter, the design engineer or hydrologist will need to follow the following steps.



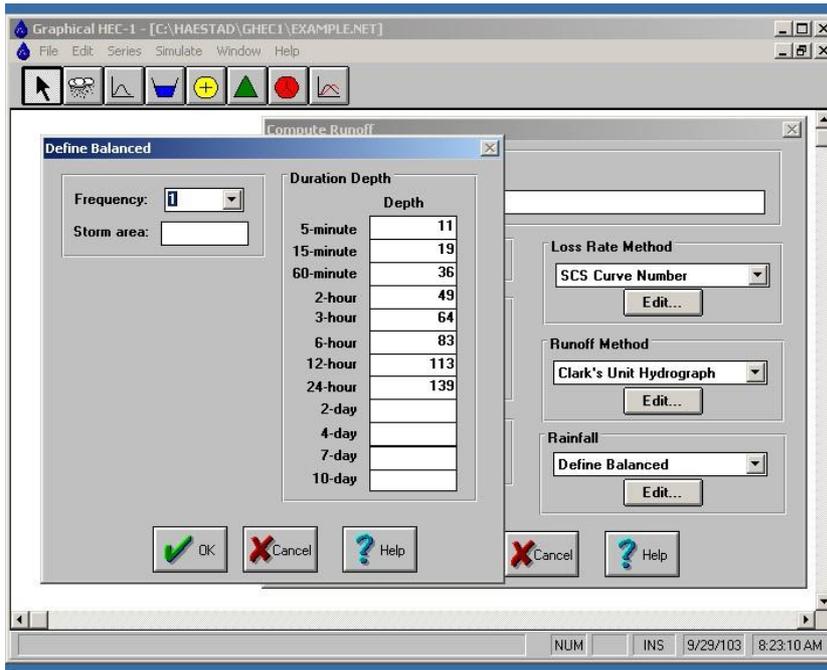
Step 1 – Select the storm item to open a new basin model and enter catchment size under drainage area.



Step 2 – Select the SCS curve number item under the loss rate method and enter the initial abstraction, Curve Number (CN), and Percent impervious area (CIA) in the boxes as shown. These items should be worked through as discussed in the previous chapter.

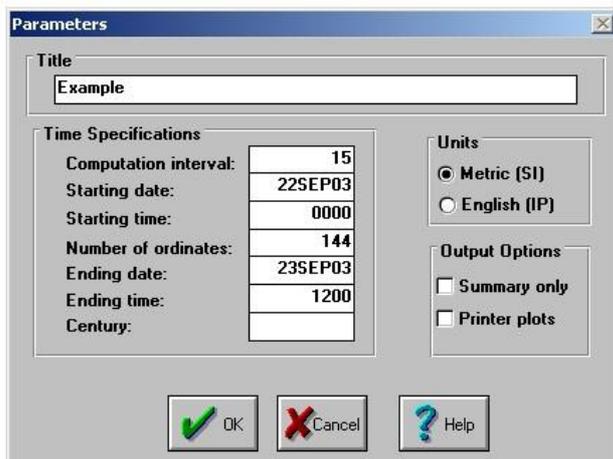


Step 3 – Calculate the time of concentration and enter the time, (in hours), and the assessed storage coefficient under the Clarkes Unit Hydrograph runoff method.

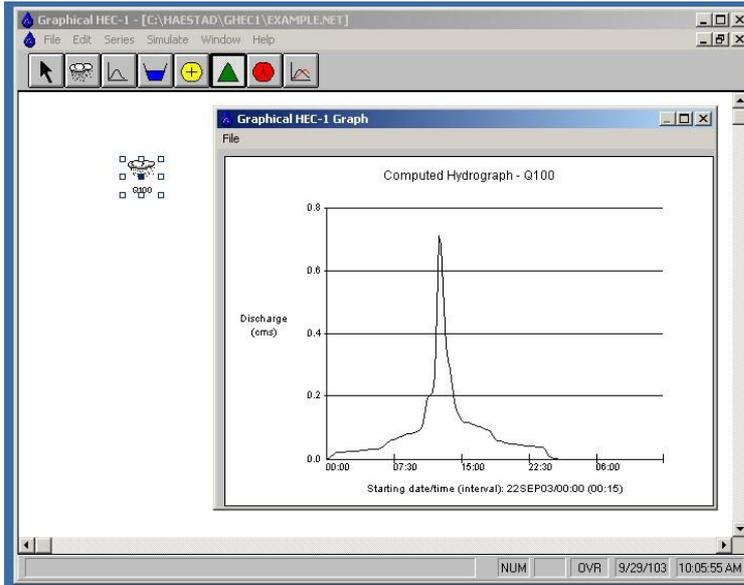


Step 4 – Add in the balanced rain event under ‘Define Balanced’ in the rainfall portion of the model. These values would be calculated as per sections 2.2.1.

This is all the data that is required to run the model. Typically, the model would be run for the full 24 hour storm but in some special circumstances it could be run for shorter periods of time. The hydrograph can be reduced to a 12-hour storm simply by leaving the 24 hour rainfall depth out of the rainfall duration depth series. The model will automatically adjust to a 12-hour storm.

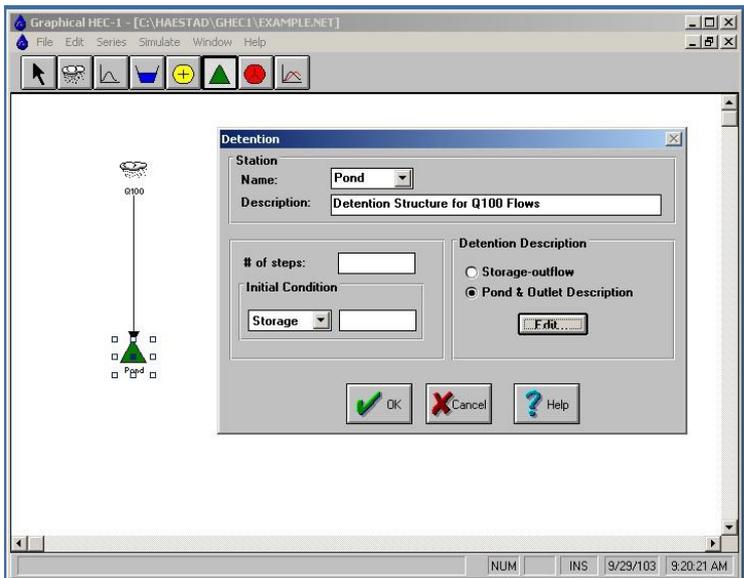


Step 5 – From the *simulation* menu the model parameters need to be entered to allow the programme to be run. Typically for a 24 hour storm the model is run for 36 hours as shown above to allow for the full hydrograph to be represented. In situations where detention is being modelled this may need to be further extended to allow for slow drawdown from detention structures. The final results of the analysis can be represented in tabular form or graphically as shown below.



3.1 Storage Structures

Storage ponds and other structures can be easily modelled within the HEC system by running the newly calculated unit hydrograph through a stage-storage-discharge relationship. Pond and outlet relationships are defined from first principles and entered into the detention basin. The hydrograph is attached to the basin, and the model run as before.

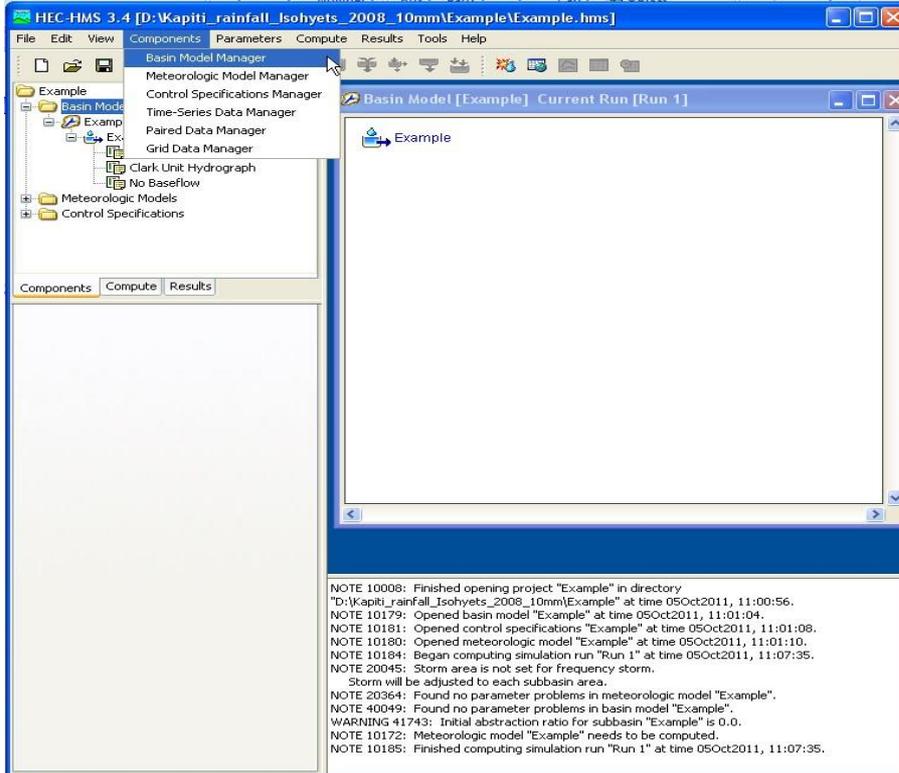


4. US Army Corps of Engineers HEC-HMS

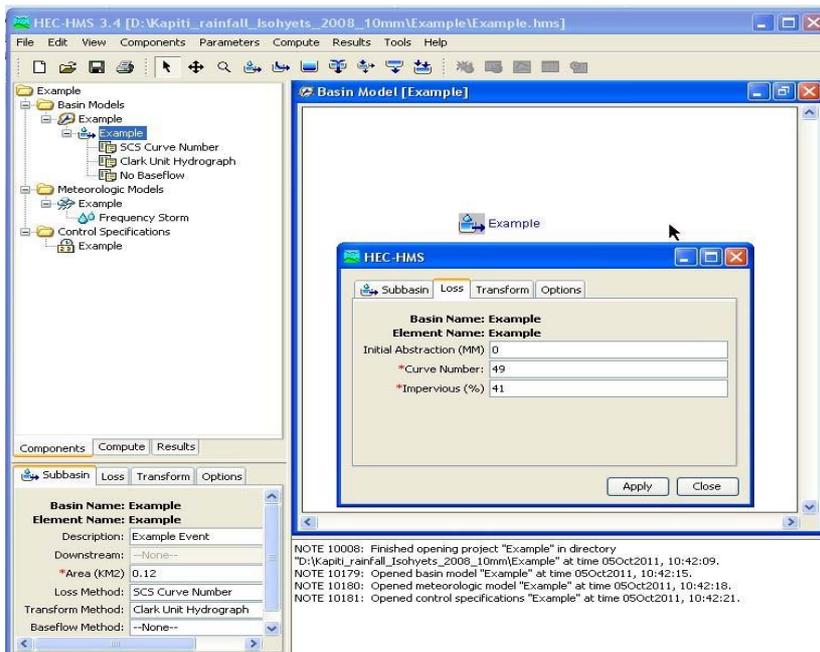
The freeware version of the unit hydrograph modelling software is available off the internet as HEC-HMS. Also available for download with this software are full software user manuals. To compute a unit hydrograph the following steps need to be completed.

For each hydrological 'project' there are three separate 'model' components. These are the basin model, the meteorological model, and the control specifications. Each of these components can be created under the *component* menu in the project screen.

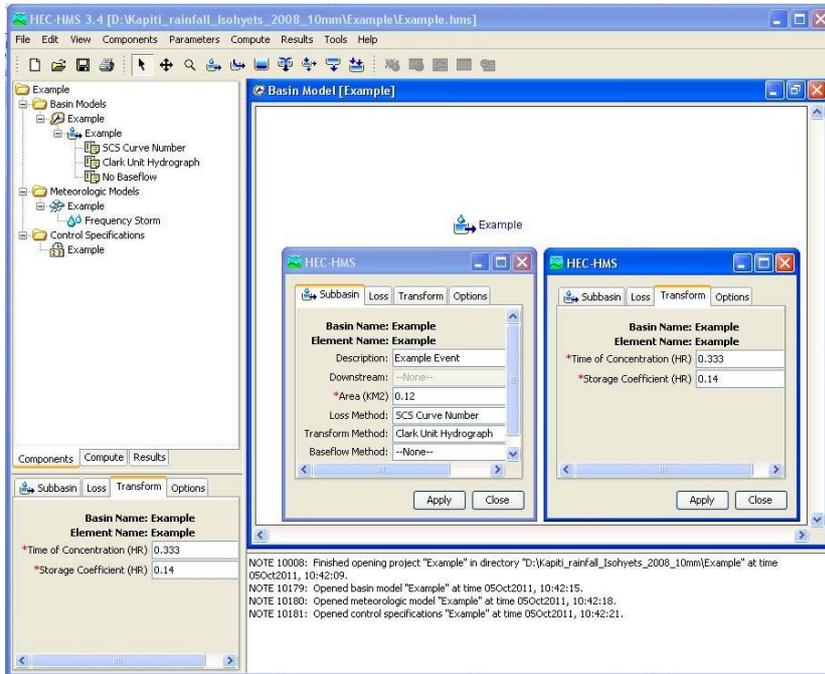
Updated Isohyet Based Calculation of Design Peakflows



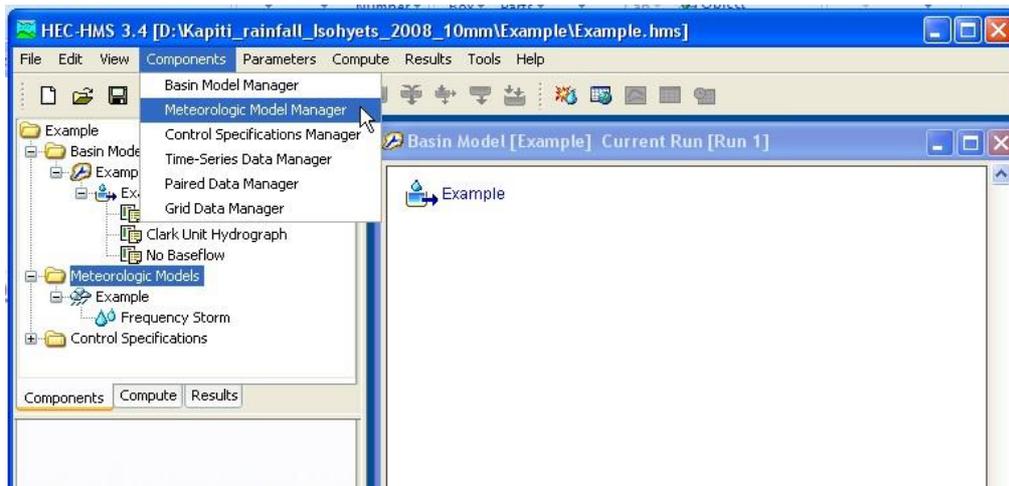
Step 1 – Create a new basin model manager and open a sub-basin element using the sub-basin creation tool. This icon is displayed on the toolbar. Once this element has been created the catchment characteristics can be entered into the model.



Step 2 – Select the loss rate method as the SCS Curve Number, and enter the initial abstraction, loss rate, and connected impervious area data into the model as outlined in chapter 2.

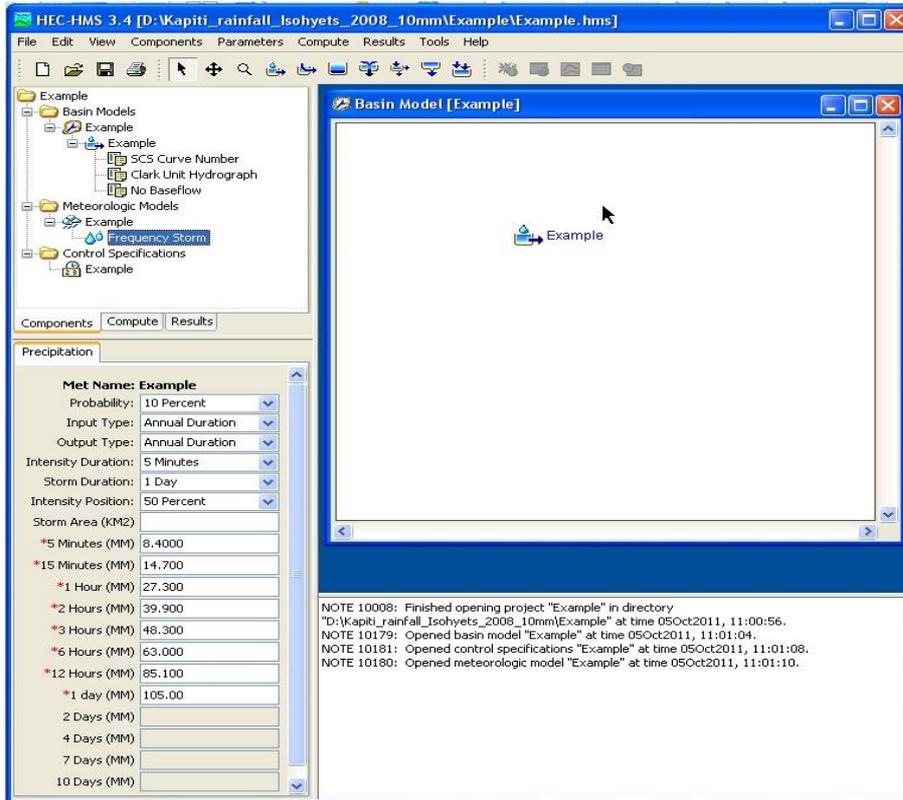


Step 3 – Select the unit hydrograph method as the 'Clark' unit hydrograph and enter time of concentration and storage ratio into the model. Baseflow should be set to 'none' unless some good data is available and the baseflow is going to be significant comparative to the peakflow and total storage volumes.

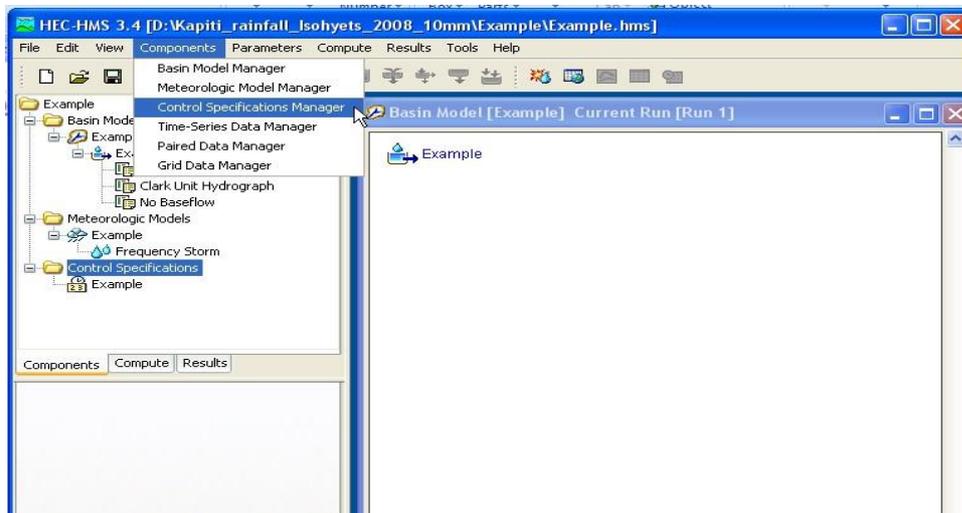


Step 4 – A meteorological model needs to be created under the *component* menu of the project. Once this is defined it can be opened to allow entry of design rainfall information as shown below.

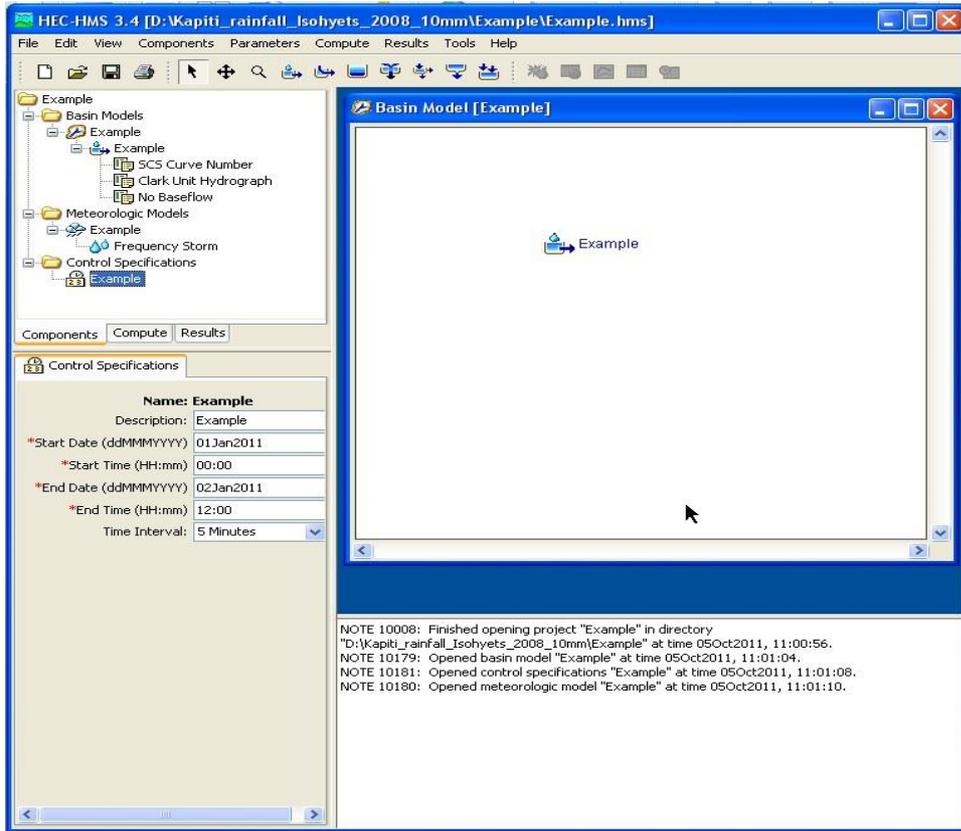
Updated Isohyet Based Calculation of Design Peakflows



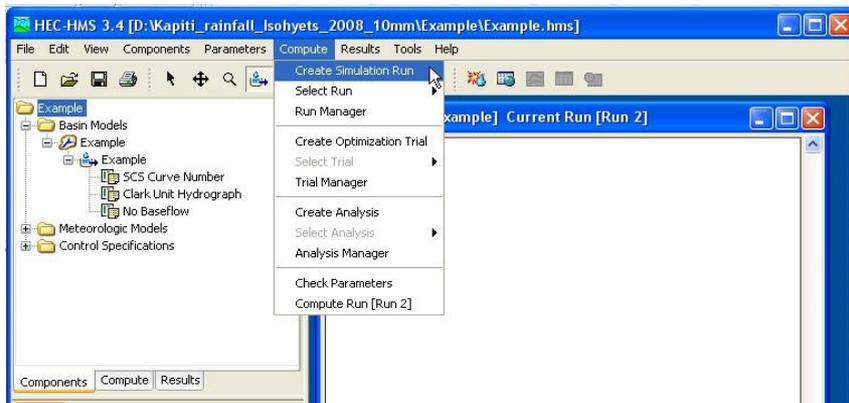
Step 5 – Selecting the ‘frequency storm’ method from the menu, the balanced rainfall data can be entered into the meteorological model.



Step 6 – A control specification needs to be created under the *components* menu of the project. Once this is defined it can be opened to allow entry of information as shown below



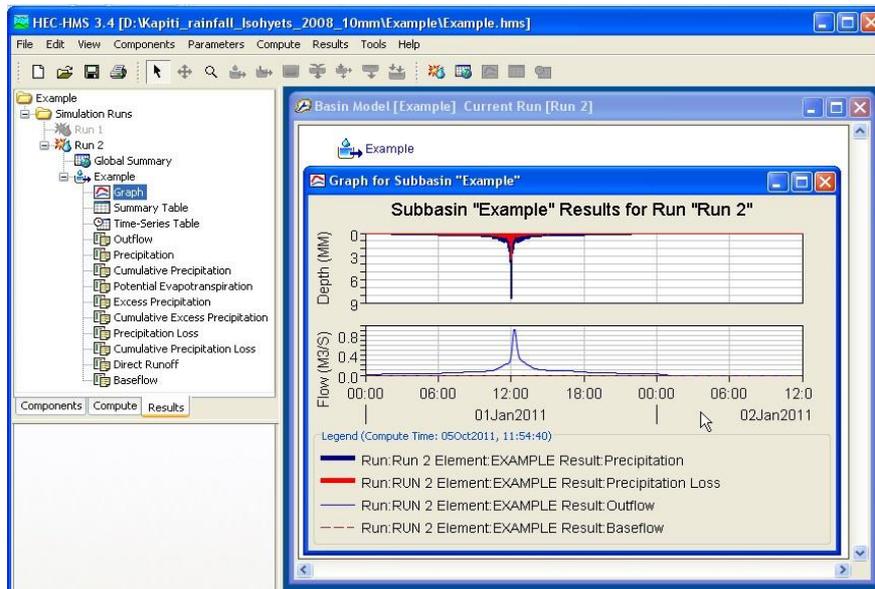
Step 7 – The control specifications are essentially the project time and date running parameters. Again, the models should be run for 36 hours as in the previous chapter.



Step 8 – Once the control specifications have been set, the project model run is set up by selecting *Create Run Simulation* under the *Compute* menu. Here the run is given a name and the Basin Model, Metrologic Data and Control Specifications are selected.

The model is run by selecting *Compute Run* under the *Compute* menu or using the icon on the toolbar.





Results can be viewed by selecting the Results Tab. From here the results can be viewed as graphs as well as time series and general tabular data.

4.1 Storage Structures

Storage structures in HEC-HMS are developed as a detention structure within the basin model. Again, pond and outlet relationships are defined from first principles and entered into the detention basin. The stage storage and discharge relationship will be based on specific outlet conditions that would be engineered for each specific situation.

5. Model Limitations

5.1 Rainfall Isohyet Plans

Statistically the frequency analysis undertaken on the available rain gauge sites is sound. Development of the regional isohyets brings these records together in a broad way however, and will tend to ignore small local differences. It should also be noted that most of the upper catchment gauges (Taungata, Oriwa, McIntosh and Kapakapanui) have the shortest rainfall records and may therefore be subject to change in the longer term when a more substantial record is available.

5.2 Calibration of Empirical Assumptions

Calibration of empirical assumptions for the development of extreme event storms, covered in this report, is limited. Previous work undertaken by Watts (2002), while providing good data on Initial Abstraction, lacked the large storm events required to meaningfully assess general losses (CN's) and storage functions (R). Some work optimising Hec-1 for the large

event storms was undertaken following the storms of October 1998, which were recorded at the Coastlands weir, but a lack of other large events at this gauging station is again a limitation to these results.

The data that has been analysed has typically been from catchments of less than 7 km². The isohyet-based approach to analysing catchment runoff should not typically be applied to catchments with a greater area than this before further calibration work being completed.

For the designer it is important to recognise that due to this a lack of existing hydrometric data the approach encompassed in this report is essentially an uncalibrated empirical process and should be treated as such.

5.3 *Further Work*

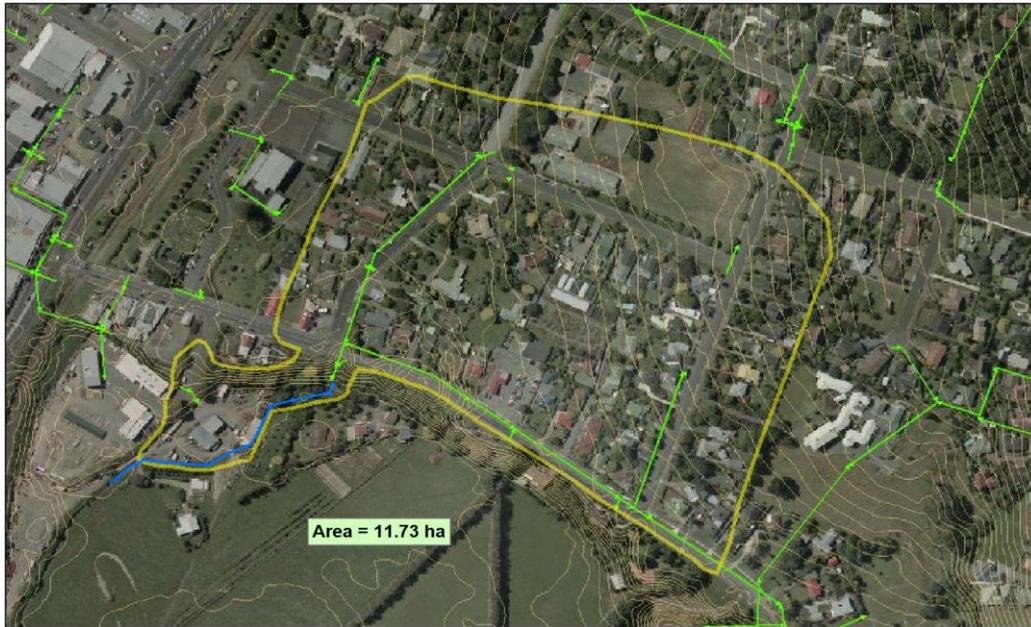
- Some additional local rain gauges through urbanising areas may, in the long term, add useful detail to the rainfall isohyet plans.
- Further analysis of I_a could be developed from the data for the Waikanae and Ōtaki Rivers.
This would give some feel for large catchment initial abstraction values.
- New data collected at the Wharemauku, Mazengarb, Mangaone and Waitahu flow gauges could be analysed for frequency, and then used to calibrate for storage runoff ratios and general catchment losses.
- Gauging of additional smaller urban streams, such as the Muaupoko and Wainui, would add to the existing knowledge base and allow for more conclusive analysis in the long term.

6. Worked Example

6.1 *Introduction*

The following example has been developed to assist the engineer in applying this standard. The example is based on a small residential/commercial catchment in Waikanae that discharges via an open channel to the Waikanae River. The area was defined as being 11.73 hectares and is drained via a formal stormwater piped network as shown below in Figure 6-1.

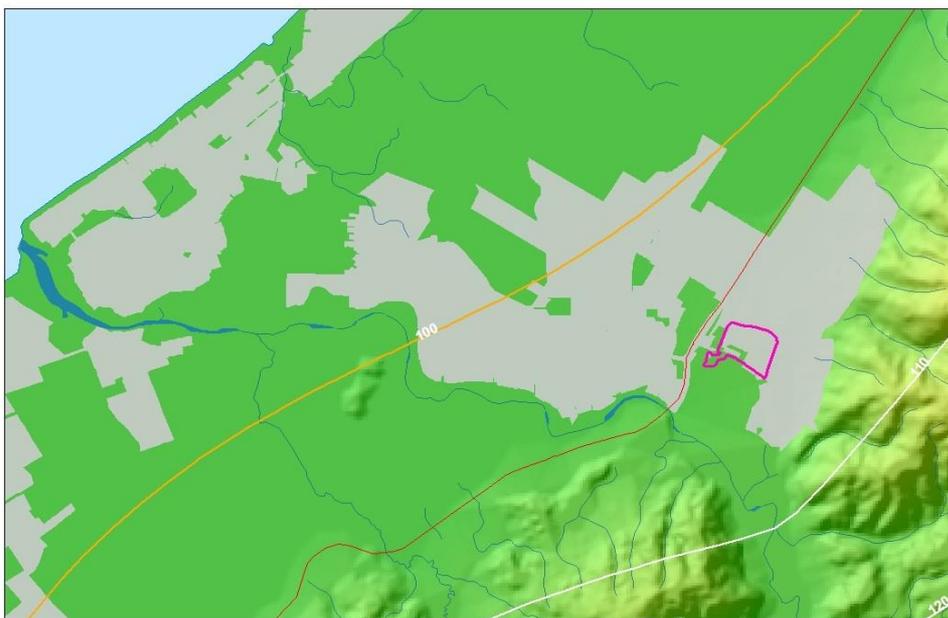
Figure 6-1. Site Plan of Example Catchment



6.2 Rainfall

Rainfall depths are taken from the 10-year isohyets plan for the catchment area identified. Figure 6-2 locates the catchment on the isohyets plan.

Figure 6-2. Catchment Location on the 10-Year Isohyet Plan



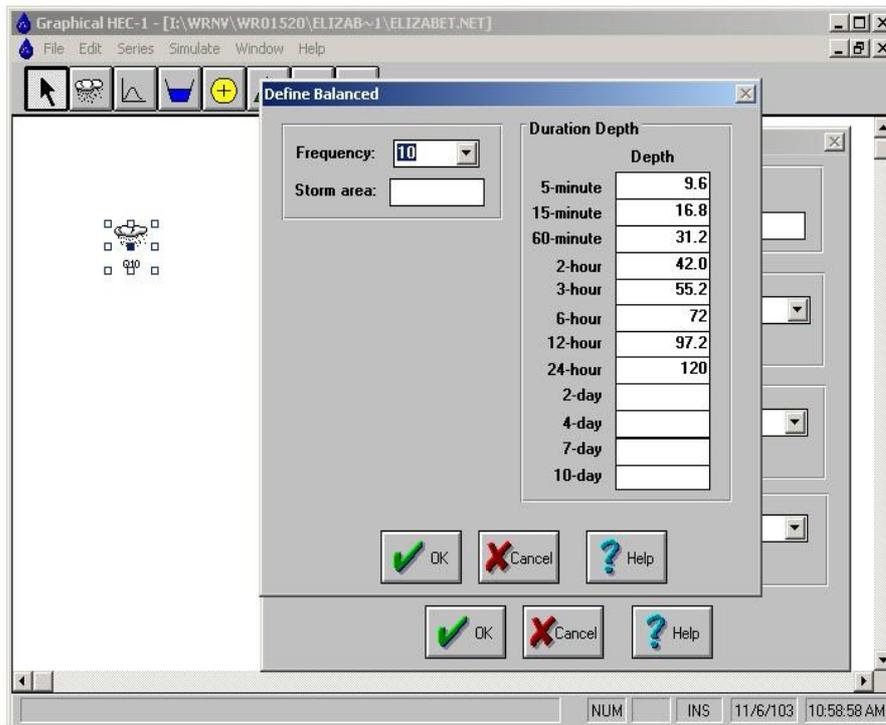
Average rainfall depths for this catchment are estimated at 105mm off the plan. This total depth is then applied to the normalised depth-duration relationship, (section 2.2.1), as shown in table 6-1.

Table 6-1: Normalised Depth-Duration Relationship for 24-hour Rainfall

Duration	Normalised Rainfall Depth (I/I_{24})	Normalised 10 Year Rainfall
5 Mins	0.08	8.4
15 Mins	0.14	14.7
1 Hour	0.26	27.3
2 Hour	0.38	39.9
3 Hour	0.46	48.3
6 Hour	0.60	63.0
12 Hour	0.81	85.1
24 Hour	1	105

These normalised 10-year rainfall depths can then be entered, with the catchment area, into the Hydrological model as outlined in chapter 3 and 4 and shown in Figure 6-3 using Graphical Hec.

Figure 6-3. Rainfall depths applied for the 10 Year Example



6.3 Catchment Characteristics

6.3.1 Initial Abstraction

Initial abstraction in a fully urbanised catchment would be set at **0mm** as outlined in section 2.2.2.1.

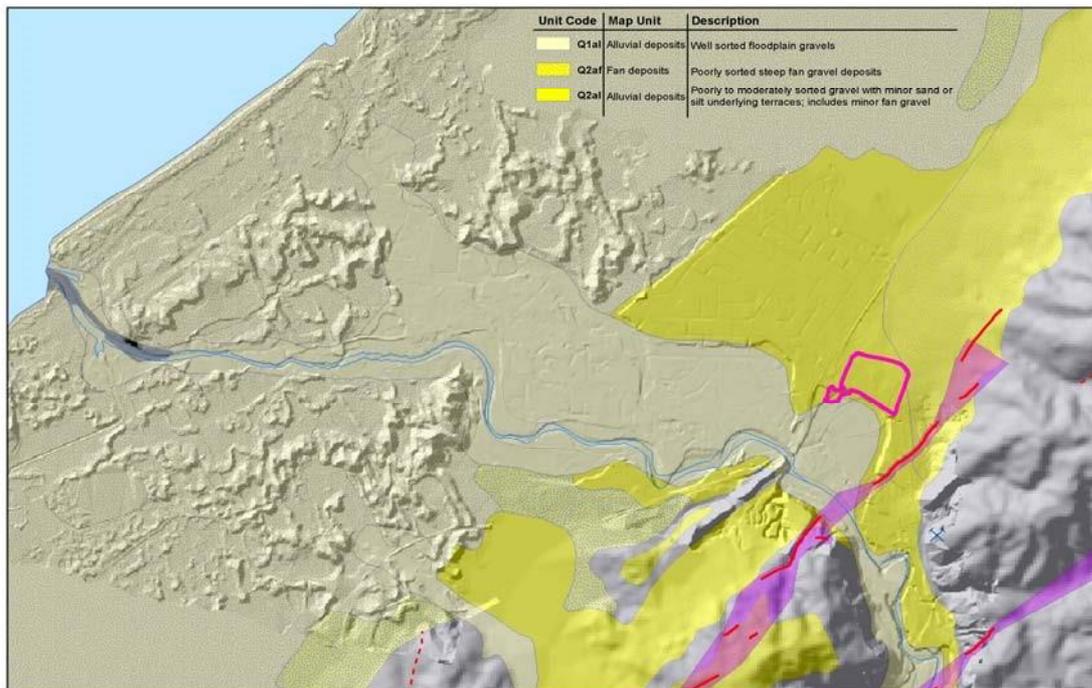
6.3.2 Curve Numbers (CN) and Connected Impervious area.

Defining soils parameters can be taken from Soil Bureau Land-Use Inventory Maps in all but urban areas. These maps are difficult to source however and may need to be supplemented by larger geological plans which also cover urban areas.

In either case site an initial site walkover should confirm the nature of the soils with ground investigation if necessary.

For the example case we have used the larger geology maps for the urban based area (figure 6-4). The geology shows a mixture of alluvial and outwash gravels that are well to moderately well drained.

Figure 6-4: Geology of the Given Catchment Area



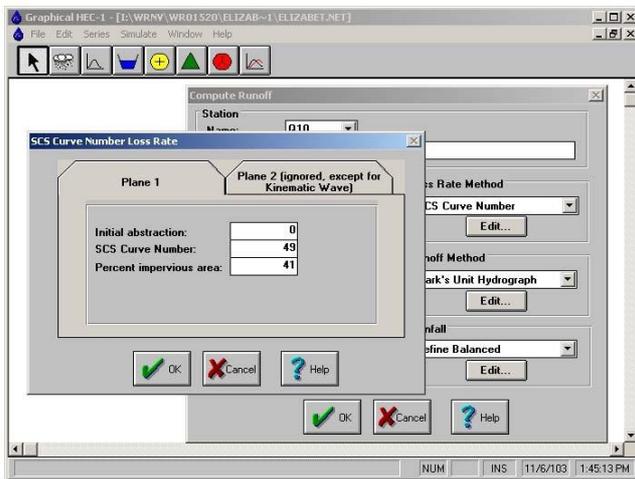
These alluvial soils are well drained and there is no record of flooding in this catchment on Councils flood incidence records. In addition previous soakage testing in this area have shown high soakage rates. From Appendix B it has been assumed that these soils would fall into category A, and that the general ground cover (lawns gardens etc) would be in fair (average) condition. This gives a **CN of 49**.

To this value the impervious portion of the catchment needs to be added. This has been estimated as 38% under section 2.2.3.2 for the Residential portion of the catchment (92%), and 72% for the remaining industrial area. This gives a weighted connected impervious area of

Industrial @ 72%*.08	5.8
Residential @ 38%*.92	35.0 Estimated
Total Impervious Area	<u>41%</u>

These loss rate characteristics are entered into the model under the loss rate method as discussed in chapter 3 and shown in figure 6-5.

Figure 6-5: Loss Rate Factors Applied for the 10-Year Example



6.4 Time of Concentration

Calculation of the time of concentration under Kāpiti district Councils new sub-divisional and development requirements is as follows.

The first step in the calculation of rainfall intensity is to determine the ‘time of concentration’ for the catchment, or the time taken for water to travel from the remotest part of the catchment to the head of the section of the drain or culvert in question.

T_c = time of flow to design point = (overland flow + open channel flow + kerb and channel flow + pipe flow), where:

- Time of overland flow for most urban drainage systems can be obtained from ‘Chart for Overland Flow’ Appendix C.

If the natural surface is longer than 1000m the Empirical Bransby-Williams formula shall be used:

$$t_c = \frac{FL}{A^{0.1} S^{0.2}}$$

where

t_c = time of concentration in minutes

F = 59.5 when area in square metres

= 92.7 when area in hectares

L = main channel length (km)

A = catchment area

S = main channel slope (m/km)

- Time of channel flow can be obtained using Mannings formula.
- Time of kerb and channel flow can be obtained using Mannings formula for n 0.018 as an average value.
- Time of pipe flow (the example assumes a 300mm diameter) can be obtained by from the 'Chart for Pipe Flow' Appendix C.

Time of concentration shall not be taken less than 10 minutes in all areas:

The outcome for the Time of Concentration calculations for the example catchment would therefore be

Overland Flow is 20m @ 3% grade (Refer Appendix C) 10.5min

Gutter Flow is 150m @ 4.8% grade (Refer Appendix C) 2.0min

Pipe Flow is 600m @ 2% grade @ 1.8m/s (Refer Appendix C) 5.5min

Concentration time in Minutes. **Say 20min.**

6.4.1 Storage Value (R)

From section 2.2.2.3 the ratio for R has been defined as 0.30 for standard residential catchments.

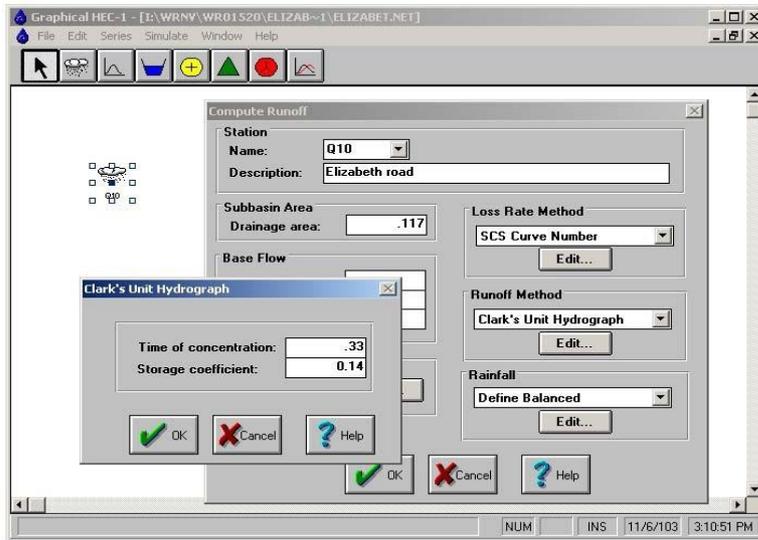
To determine R from this ratio the function $R = T_c \cdot \text{Ratio} / (1 - \text{Ratio})$ is

applied. In this case this would give an R value of

$$R = 0.33 \cdot .30 / (1 - .30) = \mathbf{0.14}$$

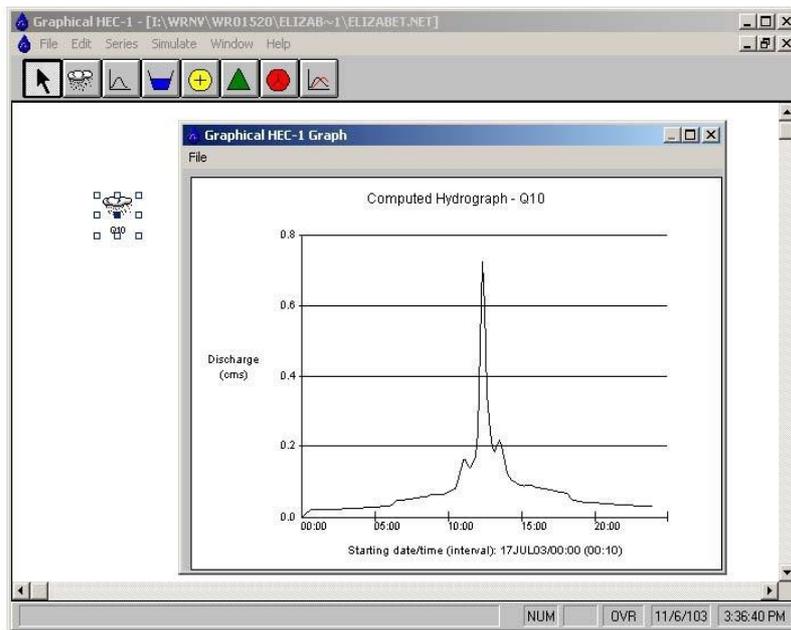
The time of concentration and R values are the final parameters to be entered into the hydraulic model as given in figure 6-6.

Figure 6-6: Concentration Times and Storage Values Applied for the 10-Year Example



This is the last of the parameters required for the calculation of the unit hydrograph which can now be computed to provide the output hydrograph. This output is given below as figure 6-7.

Figure 6-7: Output Hydrograph from 10 Year Example



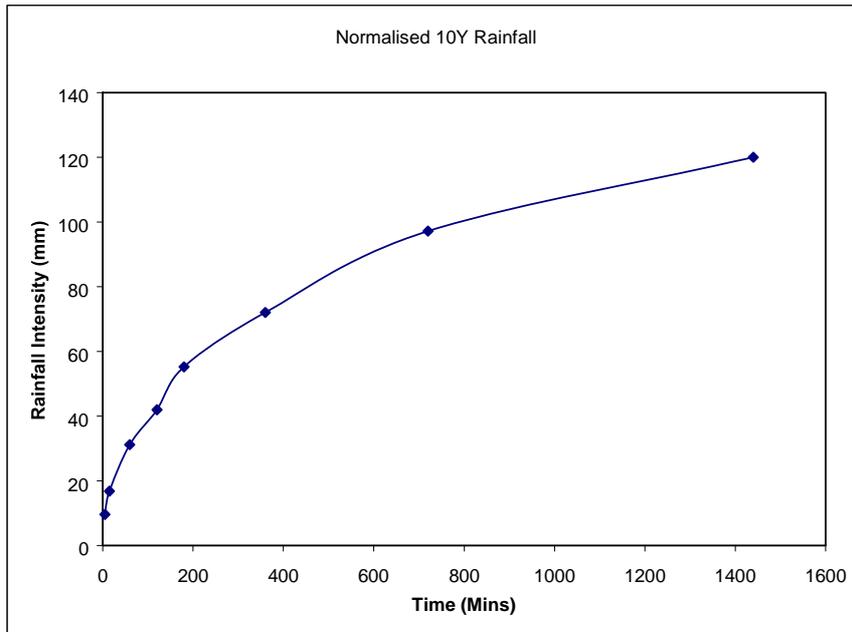
6.5 Rational Formula

The Rational Formula has been traditionally used to estimate catchment peak flows in urban areas. It is not the intention of the updated sub-divisional and development requirements to exclude the use of the rational formula for this purpose. It will typically not

be useful for calculating volume-based solutions however and will not be encouraged for use in this area of design.

The isohyets plans that have been developed can be used to provide all the rainfall intensity data required under this method. This can be achieved by plotting the normalised rainfall results from table 6-1 against time as shown below in figure 6-8.

Figure 6-8: 10-Year Rainfall Intensity Curve for the Example Catchment



Importantly it should be remembered that intensity under the rational formula is measured in hours so ensure that intensities for shorter or longer periods are factored up or down respectively.

7. References

- | | |
|---------------------------------|---|
| Maidment, D (ed.), 1992 | Handbook of Hydrology, McGraw Hill. |
| Watts, L, 2002 | Hydrologic Response and Runoff Model Parameters in the New Zealand Coastal Zone. Unpublished Masters Thesis, Victoria University of Wellington |
| Auckland Regional Council, 1999 | Guidelines for Stormwater Runoff Modelling in the Auckland Region. Technical Publication N° 108, Auckland Regional Council |
| Hoggan, D, 1996 | Computer Assisted Floodplain Hydrology and Hydraulics, Second Edition. Department of Civil and Environmental Engineering, Utah State University, McGraw-Hill. |

Updated Isohyet Based Calculation of Design Peakflows

Connell Wagner, 1999	Wharemauku Stream Hydrometric Analysis of October 20-21 st Storm, Connell Wagner Ltd
Connell Wagner, 2001	Wharemauku Stream Stormwater Runoff and Floodplain Assessment.
USACE, 2000	Hydrologic Modelling System HEC-HMC Technical Reference Manual – US Army Corps of Engineers, Hydrologic Engineering Centre
SKM, 2008	Update of Kāpiti Coast Hydrometric Analysis

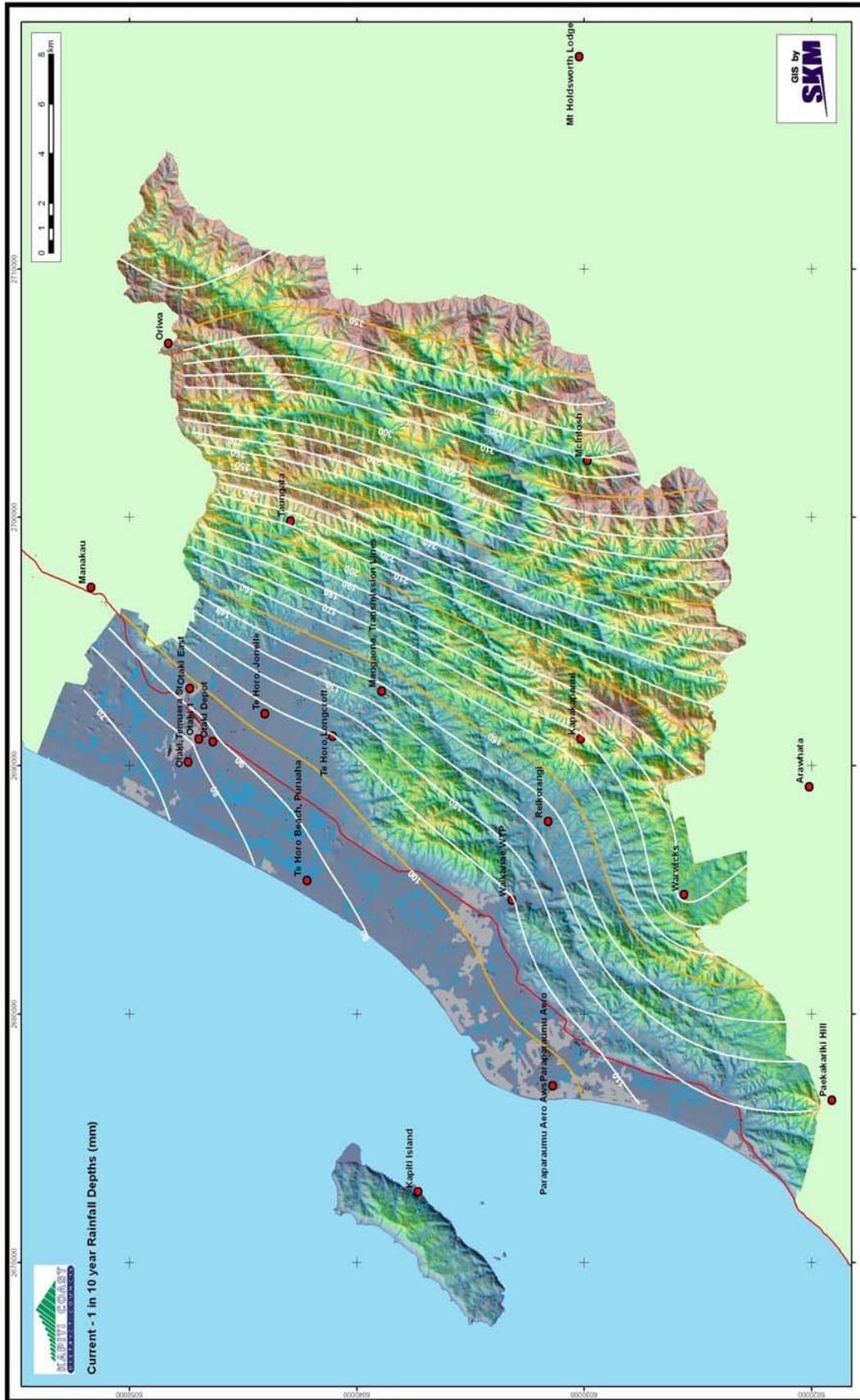


Schedule 4 Appendix A:

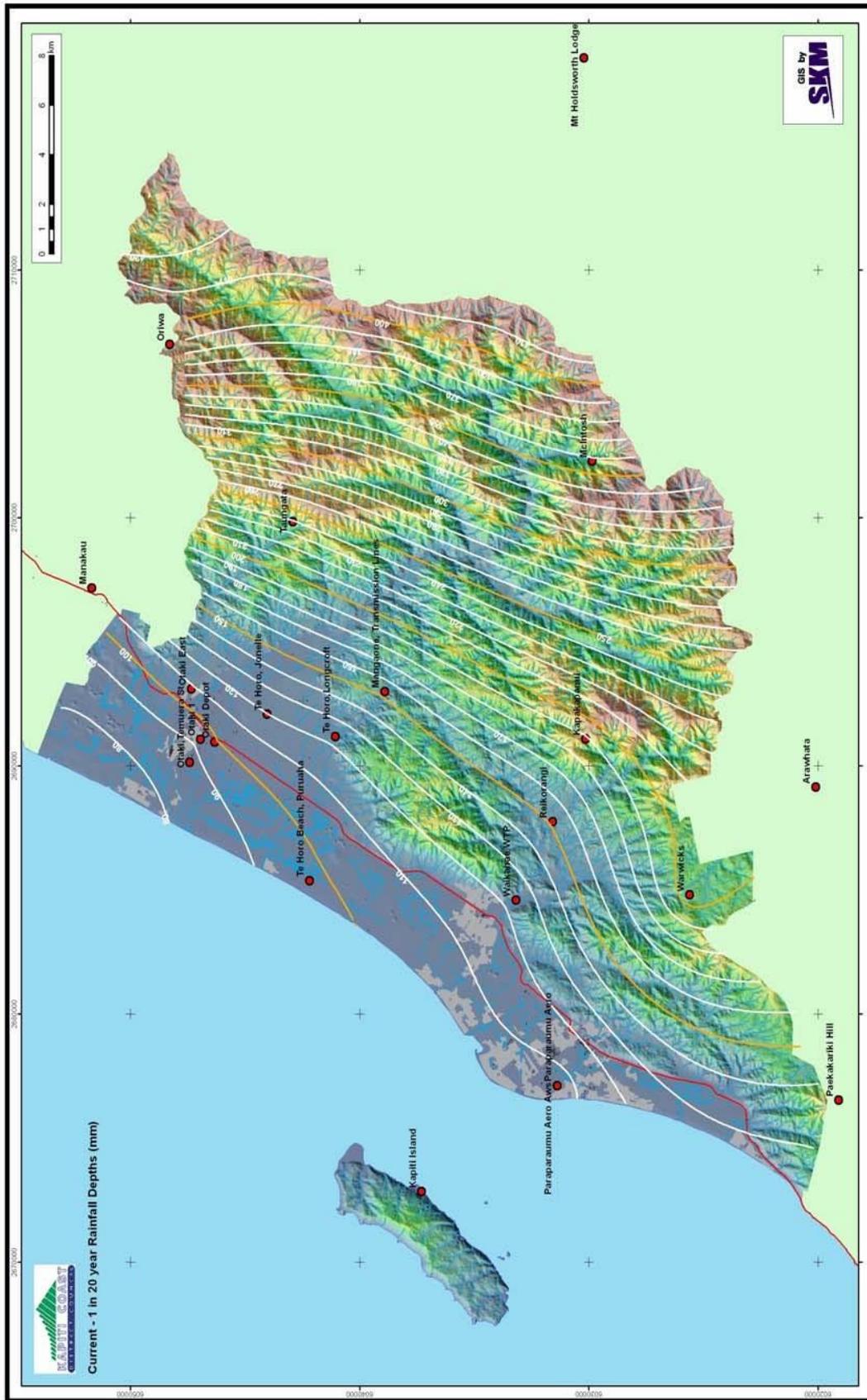
Rainfall Recurrence Isohyet Maps

Current Rainfall Recurrence Isohyet Maps

Updated Isohyet Based Calculation of Design Peakflows



Updated Isohyet Based Calculation of Design Peakflows



Schedule 4 Appendix B: Curve Number Delineation Tables

(Sourced from USACE, 2000)

Table 2-2a – Runoff curve numbers for urban areas⁴⁵ (SCS, 1986)

Cover Description Cover type and hydrologic condition Average percent impervious area ²	Curve numbers for hydrologic soil group			
	A	B	C	D
Fully developed urban areas (vegetation established)				
Open space (lawns, parks, golf courses, cemeteries etc) ⁶				
Poor condition (Grass cover <50%)	68	79	86	89
Fair condition (grass cover 50% to 75%)	49	69	79	84
Good condition (grass cover >75%).....	39	61	74	80
Impervious areas:				
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)..	98	98	98	98
Streets and roads:				
Paved curbs and storm sewers (excluding right-of-way).....	98	98	98	98
Paved open ditches (including right-of-way).....	83	89	92	93
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Western desert urban areas:				
Natural desert landscaping (pervious areas only) ⁷	63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders).....	96	96	96	96
Urban districts:				
Commercial and business..... 85	89	92	94	95
Industrial	72	81	88	91
Residential districts by average lot size:				
1/8 acre or less (town houses)..... 65	77	85	90	92
1/4 acre..... 38	61	75	83	87
1/3 acre..... 30	57	72	81	86
1/2 acre..... 25	54	70	80	85
1 acre..... 20	51	68	79	84
2 acres..... 12	46	65	77	82
Developing urban areas				

⁴ Average runoff condition, and $I_a = 0.2S$.

⁵ The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: Impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

⁶ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁷ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

Updated Isohyet Based Calculation of Design Peakflows

Newly graded areas (pervious areas only, no vegetation) ⁸	77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c)				

⁸ Composite CN's to use for the design of temporary measures during grading and construction should be computed using **SINCLAIR KNIGHT MERZ** figure 2-3 and 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Updated Isohyet Based Calculation of Design Peakflows

Table 2-2b: Runoff curve numbers cultivated agricultural lands¹ (SCS, 1986)

Cover type	Cover Description	Hydrologic condition ⁹	hydrologic soil group				
			A	B	C	D	
Fallow	Bare soil		77	86	91	94	
	Crop residue cover (CR)	Poor.....	76	85	90	93	
		Good.....	74	83	88	90	
Row crops	Straight row (SR)	Poor.....	72	81	88	91	
		Good.....	67	78	85	89	
	SR + CR	Poor.....	71	80	87	90	
		Good.....	64	75	82	85	
	Contoured (C)	Poor.....	70	79	84	88	
		Good.....	65	75	82	86	
	C + CR	Poor.....	69	78	83	87	
		Good.....	64	74	81	85	
	Contoured & terraced (C&T)	Poor.....	66	74	80	82	
		Good.....	62	71	78	81	
C&T + CR	Poor.....	65	73	79	81		
	Good.....	61	70	77	80		
Small grain	SR	Poor.....	65	76	84	88	
		Good.....	63	75	83	87	
	SR + CR	Poor.....	64	75	83	86	
		Good.....	60	72	80	84	
	C	Poor.....	63	74	82	85	
		Good.....	61	73	81	84	
	C + CR	Poor.....	62	73	81	84	
		Good.....	60	72	80	83	
	C&T	Poor.....	61	72	79	82	
		Good.....	59	70	78	81	
	C&T + CR	Poor.....	60	71	78	81	
		Good.....	58	69	77	80	
	Close-seeded or Broadcast	SR	Poor.....	66	77	85	89
			Good.....	58	72	81	85
Legumes or Rotation	C	Poor.....	64	75	83	85	
		Good.....	55	69	78	83	
Meadow	C&T	Poor.....	63	73	80	83	
		Good.....	51	67	76	80	

¹ Average runoff condition, and Ia = 0.2S.

⁹ Hydrologic condition is based on combination of factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes in rotations, (d) percent of residue cover on the land surface (good \geq 20%), and (e) degree of surface roughness.
 Poor: Factors impair infiltration and tender to increase runoff.
 Good: Factors encourage average and better than average infiltration and tend to decrease runoff.
 Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

Table 2-2c: Runoff curve numbers for other agricultural lands¹⁰ (SCS, 1986)

Hydrologic Cover Type	Condition	Curve numbers for cover description hydrologic soil group			
		A	B	C	D
Pasture, grassland or range-continuous forage for grazing. ¹¹	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay		30	58	71	78
Brush-weed-grass mixture with brush the major element ¹²	Poor	48	67	77	83
	Fair	35	56	70	77
	Good ¹³	30	48	65	73
Woods-grass combination (orchard or tree farm) ¹⁴	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ¹⁵	Poor	45	66	77	83
	Fair	36	60	73	79
	Good ⁴	30	55	70	77
Farmsteads-buildings, lanes, driveways and surrounding lot		59	74	82	86

¹⁰ Average runoff condition, and $la = 0.2S$.

¹¹ *Poor*: 50% ground cover or heavily grazed with no mulch. *Fair*: 50 to 75% ground cover and not heavily grazed. *Good*: >75% ground cover and lightly or only occasionally grazed.

¹² *Poor*: 50% ground cover. *Fair*: 50 to 75% ground cover. *Good*: >75% ground cover.

¹³ Actual curve number is less than 30; use CN = 30 for runoff computations.

¹⁴ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture

¹⁵ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil

Table 2-2d: Runoff curve numbers for arid and semi-arid rangelands¹

Cover Description	Hydrologic Condition ²	A ³	Curve numbers for hydrologic soil group		
			B	C	D
Herbaceous – mixture of grass, weeds and low-growing brush, with brush the minor element	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen – mountain brush mixture of oak brush, 2) aspen, mountain mahogany, bitter brush, maple, and other brush	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper – pinyon, juniper or both grass understorey	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub – major plants include saltbrush, Greasewood, creosotebush, black brush, bursage bursage, Palo verde, mesquite and cactus	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and $I_a = 0.2S$.

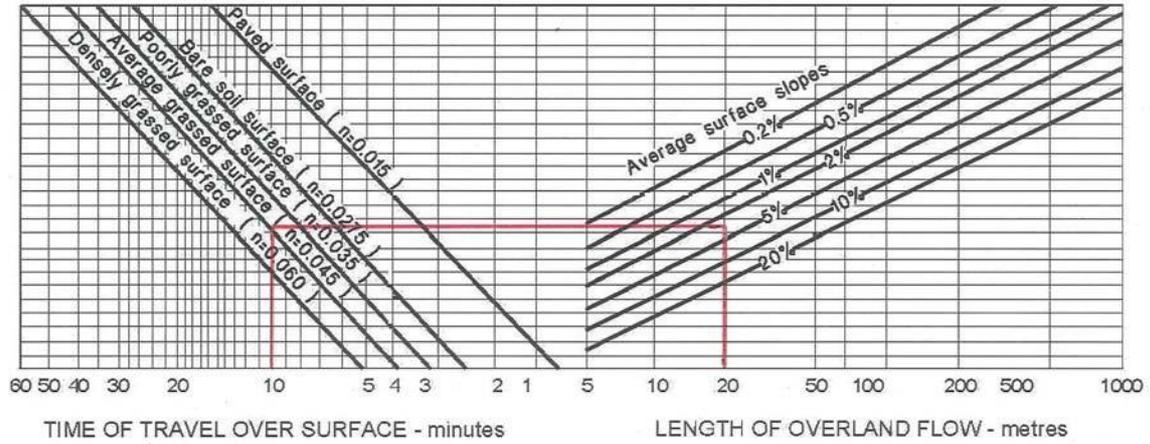
² *Poor*: <30% ground cover (litter, grass and brush overstorey).

Fair: 30 to 70% ground cover. *Good*: >70% ground cover

³ Curve numbers for group A have been developed only for desert shrub

Schedule 4 Appendix C: Time of Concentration Calculations

Overland Flow Calculation



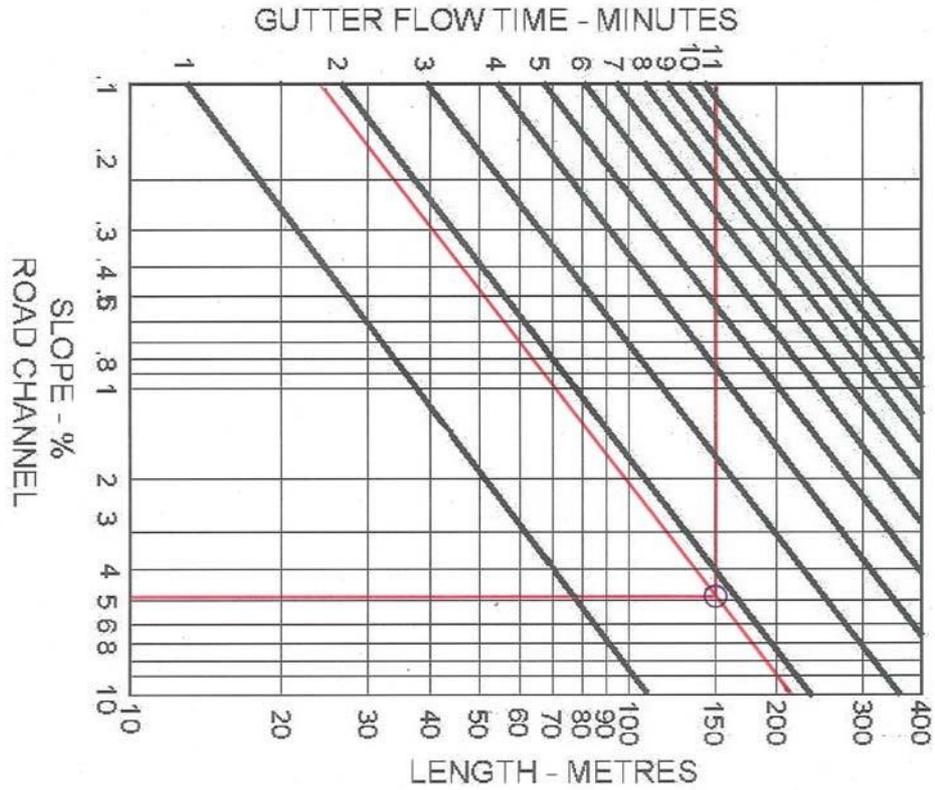
Source: Compliance Document for New Zealand Building Code

Clause E1

Surface Water

Gutter Flow Calculation

Updated Isohyet Based Calculation of Design Peakflows



Source: Compliance Document for New Zealand Building Code

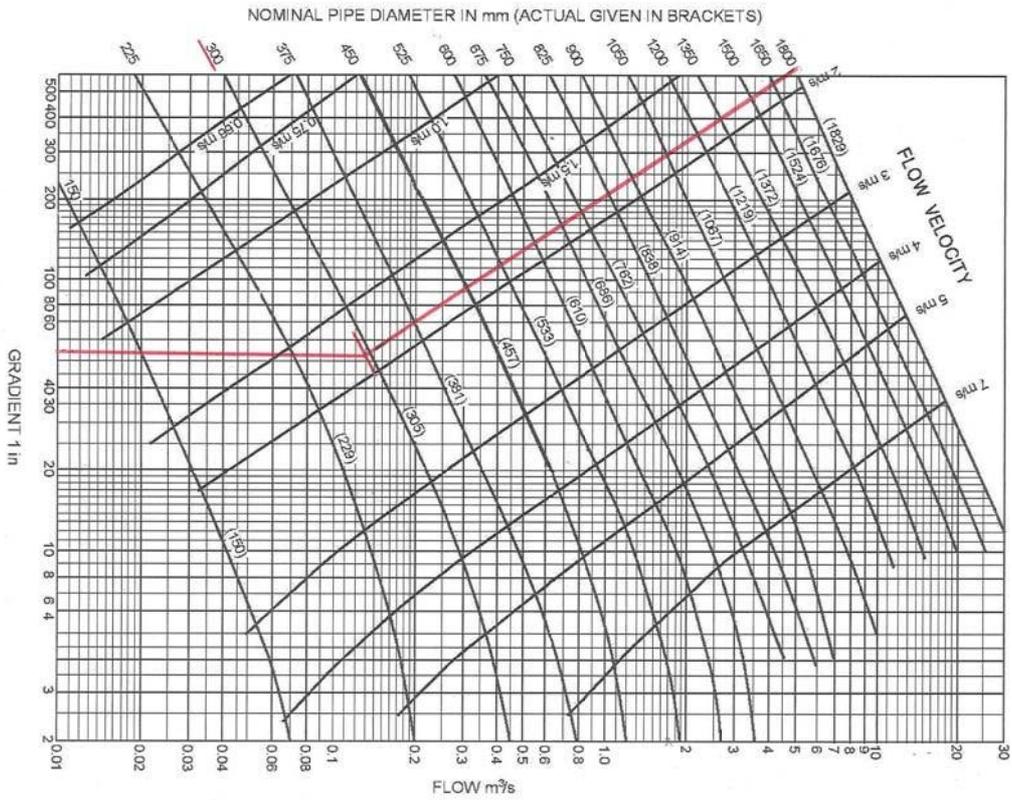
Clause E1

Surface Water

Pipe Flow Calculation

(Note: chart relates to concrete pipes)

Updated Isohyet Based Calculation of Design Peakflows



Source: Compliance Document for New Zealand Building Code
 Clause E1
 Surface Water

SCHEDULE 5

Kāpiti Coast District Council

Altered requirements to

Section 5 NZS 4404:2010 Wastewater

This section sets out Council's infrastructure design standards. Council's Construction Drawings and Specifications, including the approved materials list, (CSDS) may differ from those presented in NZS4404:2010. The CSDS sit outside this document as the ability for regular review must be preserved. The version available on Council's website therefore will be the sole controlled version of the CSDS. The onus is therefore on users to be familiar with and refer to the latest version of the CSDS.

The Kāpiti Coast District Council has adopted Section 5 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 5.2.2** *Referenced documents*

Add paragraph:

The Council standard drawings shall also be considered a reference document for these works.

2. **Clause 5.3.4.3** *Topographical considerations*

Add paragraph:

Design of proposed and future reticulations should avoid the use of pump stations. All gravity options must be explored and shown not to be practical before any consideration will be given to the use of a pump station.

3. **Clause 5.3.5.1** *Design flow*

6. *Residential flows*

a. Replace sub-clause (i) with:

Allow for dry weather flow of 250 litres per day per person, unless otherwise approved by the Council.

b. Replace sub-clause (iv) with:

Allow for 2.5 people per dwelling, unless otherwise approved by the Council.

7. *Commercial and industrial flows*

Replace table 5.1 – Commercial and industrial flows with:

Industry type	Water use (m ³ /year)	Design flow (litre/second/hectare)
light	<350	0.4
medium	>350 but <600	0.7
heavy	>600	1.3

4. **Clause 5.3.6.2** *Seismic design*

Specific flexible joint system to be incorporated in all pipe work adjacent to any rigid or large structure (pumps, manholes, chamber bridges, etc). Underground structures shall be designed to resist floatation from high-water table and earthquake liquefaction.

5. **Clause 5.3.6.8** *Trenchless technology*

Replace sub-clause (o) with:

Clearances from services and obstructions shall be greater than 1.0 metre.

Replace sub-clause (p) with:

The depth at which the pipeline is to be laid to ensure minimum cover is maintained (i.e. no less than 0.9m for gravity mains, and no less than 0.75m for pressure mains).

6. **Clause 5.3.7.1** *Pipe location*

Replace clause (a) with:

The Council's requirements for pipe locations are that they should be kept within the road reserve or other public open space, except where topography does not practically permit this.

7. **Clause 5.3.7.2 Materials**

Replace existing section with:

Construction specifications, approved materials list and standard drawings are available on the Council's website. The onus is on users to be familiar with, and refer to, the latest version.

8. **Clause 5.3.7.4 Pipes in private property**

Replace second paragraph with:

The design shall allow access for all equipment required for construction and future maintenance. Except where obstructions or topography dictate otherwise, pipes shall run parallel to boundaries at minimum offsets of 1.5m and be 2.0m from any structure.

Add the following clause:

Easements are required for protecting public wastewater pipelines located in private property and shall be centred on the as-built position of the pipeline. The easement shall be a minimum of 2 times the depth of the pipe to invert plus the outside diameter of the pipe or 3m wide, whichever is greater. The easement shall provide unlimited and unrestricted access for the Council to undertake maintenance work.

In shared trench situations, the easement boundaries shall be a minimum of 1.5m from the outer services.

9. **Clause 5.3.7.5 Minimum cover**

Cover requirements shall be in accordance with the manufacturer's requirements but shall be no less than 900mm in carriageways for gravity mains, between 750mm to 1200mm for pressure mains, or as otherwise required by the Council.

Where the above minimum cover is impractical then specific designed solutions are required.

Laterals at a property boundary shall be deep enough to provide gravity service and sufficient cover for mechanical protection, i.e. between 600mm and 1200mm at the termination point.

The minimum clearance to existing services is 1.0m.

10. **Clause 5.3.7.6** *Horizontal curves*

In general, horizontal curves are not acceptable unless written approval is sought from the Council's Wastewater Asset Manager. Council may consider special case situations where normal straight alignments are impractical. In these cases, specific designs, supported by appropriate information, shall be provided to enable the Council to evaluate the proposals.

11. **Clause 5.3.7.7** *Vertical curves*

Vertical curves are not acceptable, unless written approval is sought from the Wastewater Asset Manager.

12. **Clause 5.3.7.10** *Clearance from structures*

For clarification, the 'zone of influence' is considered to be at least within 2m of the building foundations.

13. **Clause 5.3.8.2** *Location of maintenance structures*

Add the following maintenance structure location:

Where two laterals from private properties feed (usually at the boundary) into a single 100mm connection to the main, an inspection chamber is required unless otherwise approved by Council.

Add the following paragraph:

All mains 300mm diameter and greater shall be deemed as trunk mains and will not be permitted to have connection made into the pipe. Such connections shall be via MHs.

14. **Clause 5.3.8.4.4** *Internal falls through MHs*

External drop structures are not acceptable and their use is discouraged. An acceptable solution is a section of steeper, graded line between two manholes.

15. **Clause 5.3.8.5** *Maintenance shaft*

1. Maintenance shafts are approved for use in accordance with the requirements of NZS 4404:2010, however are not the Council's preferred option and hence approval must be applied for before proposing these.

2. Add a new paragraph following the first paragraph:

Mini manholes, which are generally shallower than manholes, may be used in lieu of access shafts/chambers. Maximum depth shall be 900mm measured from the top of the manhole cover lid to the invert of the sewer. They shall have an internal diameter of not less than 600mm and may be constructed from concrete or be a manufactured unit from thermoplastics material. Technical details for concrete mini manholes shall be generally as per technical details for concrete manholes.

16. **Clause 5.3.8.4.6** *Flotation*

Replace existing section with:

Extensive areas of the coast have high-water tables and are potentially subject to liquefaction. All buried structures shall be designed to provide a safety factor against flotation of 1.25.

17. **Clause 5.3.10** *Connections*

The Council accepts responsibility for that part of the pipe outside private property.

(a) **Clause 5.3.10.1** *General considerations*

Add the following to the existing section:

Where an existing building is demolished or replaced:

- (a) The end of the lateral is to be capped at the main, relined or re-laid for future use.
- (b) The Council shall be advised of the final treatment.
- (c) The reuse, without relining, of an existing lateral is not permitted, unless the lateral (from the building to the public main) is free from cracks and other defects as verified with the use of CCTV and is made of a resilient pipe material such as PVC, concrete or PE.
- (d) The reuse of laterals made of earthenware or AC pipe is never permitted without lining.

(b) **Clause 5.3.10.3** *Number of connections*

Add following to the existing section:

Each unit on a cross lease shall have an individual lateral connection.

18. **Clause 5.3.11 Pumping stations and pressure main**

Pump stations will only be considered where gravity drainage is not feasible. Stations shall be located on publicly-owned land and be fully fenced with drive-on access for a medium-sized truck as defined in Austroads (with turning ability).

Public pumping stations are to be constructed in accordance with WSA 04 *Sewage Pumping Station Code of Australia*, version 2.1 (2005). However, applicants shall discuss requirements with the Council for particular proposals before final design.

In general, the Council will require:

Wet well

- (a) Wet well with minimum 2 pumps installed (pump make and model as specified by the Council).
- (b) Storage to be as per following table:

Storage volume	Public	Private
Detention volume	12 hours ADWF	12 hours ADWF
Maintenance volume	8 hours ADWF	24 hours ADWF
Total Volume (above highest pump start level)	20 hours ADWF	36 hours ADWF

- (c) For private pump stations, to allow adequate time for maintenance, the wet well shall be of a size to hold 24 hours of ADWF plus the volume of the rising main, above the pump start level. Where detention is required, an additional 12 hours of storage for a total of 36 hours ADWF is required.
- (d) Lockable aluminium checker plate lids (able to support a vehicle).
- (e) Multitrode 10-segment probes, hydrostatic pressure sensor or other approved level sensor (min, top, standby pump and overflow).
- (f) Stainless steel (S/S) or ABS pipe work within wet well, strapped to the wall of the wet well (minimum 2).

- (g) Emergency overflow to approved overflow discharge point with NRV.
- (h) Wash-down facilities with back-flow prevention (reduced pressure zone style).
- (i) Pumps to be compatible with existing Council's pump stock for future maintenance requirements.
- (j) All pumps to be submersible type on guide rails with pump pedestals.
- (k) Pump station site to be protected from vehicular access (i.e. in compound, bollards around station).
- (l) Medium- and/or large-sized pump stations shall have a grit chamber installed before the wet well.

Valve chamber

- (a) Isolating Valve and Non-Return Valve (NRV) on each lift pipeline before joining into common rising main.
- (b) Lockable aluminium checker plate lids (able to support a vehicle).
- (c) Rising main to be PE100 minimum PN12 pipe.
- (d) Valve chamber to drain back into the wet well with wet trap on it.
- (e) Supplied with isolating valve and coupler on rising main for over-pumping.

Grit chamber

- (a) Grit chambers to be installed on incoming lines into the wet well (as required by Council's Water and Wastewater Asset Manager).

Electrical

- (a) Above-ground control system protected from the weather.
- (b) To be in a stainless steel (S/S 316), lockable, secure cabinet.
- (c) Provision for alternative power supply (different grid zone, generator or approved adaptor for external portable power source).
- (d) Electrical switchboard and all components to IP44, with a 50-year life.

- (e) Multitrode smart pump controllers or other approved controller and soft start for 5kW or greater pumps.
- (f) Variable speed pumps for larger pump stations (soft step start or VSD).
- (g) Board to include for each pump, auto-standby-manual override switch, hour meter, start counter, amp meter and pilot lights.
- (h) Voltage indicators for each pump on all phases.
- (i) Telemetry RTU and radio to be installed for recording information and remote controlling to Council's SCADA.
- (j) All doors and/or lids to be alarmed.
- (k) Revenue meter.

An operations and maintenance manual to be supplied along with as-built plans to geodetic coordinates and levels.

Pressure mains shall be specifically designed but shall be a minimum of 100mm ID when to be taken over by the Council.

19. **Clause 5.3.12** *Pressure sewers and vacuum sewers*

Add the following paragraphs after the first paragraph:

Pressure sewer systems may be accepted by Council where gravity networks are not practicable due to high groundwater tables, flat topography or areas with a high liquefaction potential. The design of the sewer system shall be carried out by a suitable professional and be submitted to Council for approval.

Pressure sewer systems shall be designed in conjunction with this document and Water Services Association of Australia WSA 07.

The following considerations need to be fully evaluated and presented in any situation where pressure systems are being proposed:

- ownership
- maintenance
- operational

- life-cycle cost.

Consideration needs to also be given to limiting the increase in odours where connections are made to outlying, small, pumped sewer systems owned by Council and where discharge is to a gravity system.

20. **Clause 5.5.2 Trenching**

Council's trenching details differ from those presented in Appendix B drawings CM001 and CM-002. Work undertaken on Council-owned roads shall be undertaken in accordance with the *National Code of Practice for Utility Operators' Access to Transport Corridors*, unless otherwise required in the *Kāpiti Coast District Council Local Conditions* document.

21. **Clause 5.5.4 Inspection and acceptance**

Once the road surface is to a finished level and before any road surfacing, the developer shall arrange for all public and private sewer mains to be inspected by CCTV. The developer shall provide an electronic file and defects report to Council. The filming shall be done travelling upstream with a trickle of water flowing downstream to allow hollows and steps to be easily seen. All defects are to be fixed to the satisfaction of Council at the developer's cost. Where faults are found and repaired, Council may instruct the developer to re-film those lengths to ensure there are no further problems.

22. **Clause 5.5.5 Leakage testing of gravity pipelines**

- The Council requires all gravity sewer mains and laterals to be tested, either with a water test or an air test in accordance with the procedures in Appendix C of NZS 4404:2010. The developer's representative shall countersign the Council's Pipeline Pressure Test Certificate.
- For plastic pipes (PVC and PE pipes) there shall be no leakage after 5 minutes.
- The Council also requires testing of manholes and other maintenance structures. Any failure will require testing of other manholes and structures within the development. They shall be tested after a 24-hour period of soaking to allow for absorption, by completely filling with water to the top surface of the roof slab. The rate of water loss shall not exceed 0.5 litres per hour per meter diameter per metre depth. The developer's representative shall counter-sign the Council's Hydrostatic Test Certificate for Water Chamber.

23. **Clause 5.5.6** *Leakage testing of pressurised sewers*

All pumping mains shall be tested to a pressure of 600 kilopascals for domestic pressure pipes and 900 kilopascals for public drains, or 1.5 times the working pressure, whichever is the greater.

24. **Additional requirements**

- Work undertaken on Council-owned roads shall be undertaken in accordance with the *National Code of Practice Utility Operators' Access to Transport Corridors*, unless otherwise required in the *Kāpiti Coast District Council Local Conditions* document.
- Step rungs in manholes shall either be 20mm diameter stainless steel or an approved PVC-coated steel.

SCHEDULE 6

Kāpiti Coast District Council

Altered requirements to

Section 6 NZS 4404:2010 Water supply

This section sets out Council's infrastructure design standards. Council's Construction Drawings and Specifications (CSDS), including the approved materials list, may differ from those presented in NZS 4404:2010. The CSDS sit outside this document as the ability for regular review must be preserved. The version available on Council's website therefore will be the sole controlled version of the CSDS. The onus is therefore on users to be familiar with, and refer to, the latest version of the CSDS.

The Kāpiti Coast District Council has adopted Section 6 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 6.2.2** *Referenced documents and relevant guidelines*

Add further paragraph:

Design shall be in conjunction with the Council's Water Supply Bylaw 2013.

2. **Clause 6.3.5.4.1** *Hydraulic roughness values*

Add further paragraph:

Hydraulic roughness value used for design purposes shall be the larger number from table 6.1.

C6.3.5.4.1

The lower range presented in table 6.1 represents clean, straight, new pipes which would only be applicable in the first few years of the pipeline which is to be designed to have an operational life of 100 years. As the ultimate design demand is likely to manifest towards the later years on the asset's life, the design coefficients should represent an aged pipe.

3. **Clause 6.3.5.7 Sizing of mains**

Delete pipe size 225mm from table 6.2.

4. **Clause 6.3.5.8 Pressure zones**

Pressure zones are set out in the following table.

Area	Reservoir	Capacity	Floor Level	TWL
Paraparaumu	Riwai Street (high level)	0.4ML	110.50	113.30
Paraparaumu	Riwai Street (main res.)	11.25ML	62.20	68.40
Paekakariki	Main Road	1.125ML	69.13	73.77
Waikanae	Kakariki Grove	5.7ML	92.96	100.30
Waikanae	Tui Crescent	1.4ML	92.96	99.18
Waikanae	Tui High Level	Check with Water Asset Manager for detail		
Ōtaki	Waitohu Valley	0.675ML	100.00	-
Ōtaki	Tasman Road Bore operating pressure 670Kpa			

5. **Clause 6.3.5.10 Design pressures**

The Council confirms the design pressure shall be between 250kPa and 900kPa (25m to 90m head) at the point of supply. Refer to Council's Water Supply Bylaw for more detail.

Minimum requirements are that, in any road, the water main shall not be laid above a hydraulic gradient line falling at the head loss defined in paragraph 6.3.5.4, starting at a point 9m below the floor of the supply reservoir.

Minimum flows and pressures shall be set by fire-fighting requirements as per NZS PAS 4509:2008.

6. **Clause 6.3.6.1 Materials**

Note: Construction specifications and standard drawings, including the approved materials list, are available from Council. The onus is on users to be familiar with, and refer to, the latest version.

7. **Clause 6.3.6.2** *Prevention of backflow*

The Council confirms backflow prevention is required at the supply point for all properties. The actual detail for the BFP (backflow protection) is determined by the potential risk.

8. **Clause 6.3.8** *System layout*

Add to Clause 6.3.8.1 *General*:

Easements are required for protection of public water supply pipelines which are located in private property and shall be centred on the as-built position of the pipeline. The easement shall be a minimum of 2 times the depth of the pipe to invert plus the outside diameter of the pipe or 3m wide, whichever is greater. The easement shall provide unlimited and unrestricted access for the Council to undertake maintenance work.

In shared trench situations, the easement boundaries shall be a minimum of 1.5m from the outer services.

Add to Clause 6.3.8.2 *Reticulation layout*:

In rights-of-way serving three or more lots, a DN 63mm (50mmID) PE100 (or Council-approved material) rider main shall be laid within the right-of-way with service connections provided to each lot at their boundaries. Fire-fighting requirements may require some or the entire main to be Diameter Nominal (DN) 100mm with appropriately placed hydrant(s). Easements are required as outlined in the addition to Clause 6.3.8.1 above.

Add to Clause 6.3.6.3 *Mains layout*:

All mains within central business districts (CBDs) shall have minimum size DN 150mm. Mains greater than DN 250mm shall be metallic and deemed to be principal mains.

9. **Clause 6.3.8.7** *Shared trenching*

The Council allows shared trenching.

10. **Clause 6.3.10.3.3** *Nominated pipe PN*

Minimum pipe class shall be PN12 throughout the district. All fittings shall have a minimum PN16 rating, unless otherwise stated. All flange details shall be to AS/NZS 4087:2011 Metallic Flanges for Waterworks Purposes.

11. **Clause 6.3.10.4** *Pipe materials*

Note: PVC-O, PVC-U and PVC-M shall be Series 2.

Construction specifications and standard drawings, including the approved materials list, are available from Council. The onus is on users to be familiar with, and refer to, the latest version.

12. **Clause 6.3.12.2** *Seismic design*

Add further paragraph:

Much of the area is subject to liquefaction or ground deformation. All principal mains (250mm and larger) shall be metallic pipe and have a restraint jointing system.

Structures such as pump stations and reservoirs shall incorporate additional restraints against earthquakes and flexible jointing systems adjacent to such structures.

13. **Clause 6.3.12.10.1** *Minimum pipe cover*

Ridermain pipe cover shall be 600mm to 800mm, unless otherwise approved by the Council's Water and Wastewater Asset Manager.

The maximum depths of water mains must be indicated on construction drawings. Water main pipe cover shall be 750mm to 1200mm, unless otherwise approved by the Council's Water and Wastewater Asset Manager.

All pipe work is to be installed after the installation of kerb lines to ensure it is parallel to kerb and at a specified depth.

14. **Clause 6.3.13** *Reservoirs and pumping stations*

If reservoirs and/or pump stations are proposed, then these should be discussed with the Council at an early stage. Reservoirs will require specific design by a suitably qualified and experienced person. Pumping stations are required to meet the design criteria in WSA 03, *Water Reticulation Code of Australia*, version 3.1 (2011), and, in general, the Council will require:

- (a) Pumping stations shall be located on publicly-owned land and shall be fully fenced with drive-on access (with turning ability).
- (b) Stations shall have not less than 2 pumps (either soft start or VSDs).
- (c) Pumps and controls are to be housed above ground in a single-weather and vandal-proof building.
- (d) Emergency overflow to be installed to approved overflow discharge point with NRV.
- (e) Isolating Valve and Non-Return Valve (NRV) on each lift pipeline before joining into common rising main.
- (f) Generally, for smaller rising, main to be PE100 pipe material with minimum PN12 pressure rating.
- (g) Provision for alternative power supply (different grid zone, generator or approved adaptor for external portable power source).
- (h) Electrical switchboard and all components to IP44, with a 50-year life.
- (i) Multitrode, smart pump controllers, or other approved controller, and soft start for 5kW or greater pumps.
- (j) Variable speed pumps for larger pump stations.
- (k) For each pump, board to include auto-standby-manual override switch, hour meter, start counter, amp meter and pilot lights.
- (l) Voltage indicators for each pump on all phases.
- (m) Telemetry RTU and radio to be installed for recording information and remote control to Council's SCADA system.
- (n) All doors and/or lids to be alarmed.
- (o) A revenue meter.

An operations and maintenance manual to be supplied along with as-built plans to geodetic coordinates and levels.

15. **Clause 6.3.14.3** *Siting of valves*

Delete last paragraph and replace with:

Valves DN \geq 100mm shall be resilient, seated sluice valves. In-line valves shall be the same diameter as the reticulation main.

16. **Clause 6.3.14.3.2** *Branch mains*

Construction specifications, an approved materials list and standard drawings differ from NZS 4404:2010 standard detail and are available on the Council's website. The onus is on users to be familiar with, and refer to, the latest version.

All ductile iron (DI) tees and sluice valves shall be flange/flange (FL/FL) with AS/NZS 4087:2011 PN 16 flange drilling.

17. **Clause 6.3.14.7.1** *Scour sizes*

Replace 80mm scour size with 100mm in table 6.7.

18. **Clause 6.3.14.7.2** *Scour locations*

Delete subclause (c).

19. **Clause 6.3.16** *Connections*

(a) Add a new sub-clause 6.3.16.1:

Tapping bands shall be of LG2 gunmetal or DRZ and fully encircle the pipe. Direct tapping of the pipe is not permitted. The diameter of the holes cut into the main shall not exceed:

Pipe diameter (DN-mm)	Largest hole in pipe (mm)
100	20
150	25
200	32
250	40
300	0

The hole cut in the pipe wall for the tapping band shall be neatly cut with a single drilling of the appropriate size bit or with the use of a hole saw.

An individual service valve shall be located 450mm from the road boundary and centrally within the lot frontage.

(b) Add a new sub-clause **6.3.16.3 Applications for supply connections**

Each rateable property shall have only one standard 20mm ID connection/point of supply, generally located centrally along the front boundary and clear of any potential vehicle access, unless otherwise approved by the Council. (Note that each separate unit on a cross lease is a separate rateable property). Any connection to the Council's water supply system requires an application for a water supply connection on the standard Council water supply application form.

For new installations, a separate water service with a dual supply manifold in a toby box shall be installed for each lot. The manifold shall be provided with two feeds to the lot, one for direct feed to the dwelling and one for a feed to a rainwater tank with a restrictor limiting supply to 600 litres per day per dwelling.

All service connections shall have some form of backflow prevention. All commercial and industrial properties shall be fitted with a suitable meter and BFP device. The level of backflow prevention for industrial and commercial properties shall relate to the actual operations within the allotment.

The manifold box shall be to the Council's standard and shall have a base plate and a blue lid.

Where the connection is a new main, the Council shall make the connection at the developer's cost. Where the connection is for a service pipe to an individual property, the Council shall supply and install the service pipe, including associated valves, fittings and water meter, up to the point of supply at the developer's cost.

The Council may allow some, or all, of the above work to be carried out by an approved contractor on a case-by-case basis at its discretion.

Construction specifications, an approved materials list and standard drawings differ from NZS 4404:2010 standard detail and are available on the Council's website. The onus is on users to be familiar with, and refer to, the latest version.

Appendix 1 shows typical layouts for points of supply.

20. **Clause 6.5.1 Excavation**

Add further paragraphs:

Work undertaken on Council-owned roads shall be undertaken in accordance with the *National Code of Practice for Utility Operators' Access to Transport Corridors* unless otherwise required in the *Kāpiti Coast District Council Local Conditions* document. This applies to clause 6.5.2 *Embedment* and clause 6.5.3 *Backfilling and Reinstatement*.

Before carrying out any excavation work, the Council's as-built information shall be viewed to establish whether any Council services are in the vicinity. The Council does not guarantee the information provided is necessarily accurate or complete. Those proposing to carry out the excavation work shall conduct all necessary site checks to ensure buried services are not damaged.

21. **Clause 6.5.3.3** *Detector tape*

In open trenching, backfill shall be placed to 300mm above the pipe before laying metallic 'detector' tape.

Construction specifications, an approved materials list and standard drawings differ from NZS 4404:2010 standard detail and are available on the Council's website. The onus is on users to be familiar with, and refer to, the latest version.

22. **Clause 6.5.4** *Pressure testing of water mains*

Water mains in the district shall be tested to a pressure of 1200 kPa (180 psi) or 1.5 times the working head, whichever is greater. Testing of water mains shall be undertaken in accordance with the appropriate procedure in Appendix C of NZS 4404:2010. The developer's representative shall countersign the Council's Pipeline Pressure Test Certificate.

23. **Clause 6.5.5** *Disinfection of water mains*

Disinfection shall be undertaken as specified in Appendix D of NZS 4404:2010. The developer's representative shall ensure the appropriate chlorine concentration is used and shall countersign the Council's Pipeline Disinfection Test Certificate.

Bacteriological testing:

After disinfection and flushing, and prior to commissioning, the pipeline shall be tested to ensure disinfection was successful.

- (a) A technician from a Council approved testing laboratory shall take samples over the full length of the pipe.

- (b) If possible, two samples shall be taken over the first 100m of the pipeline, and an additional sample from locations approximately every 100m thereafter.
- (c) A minimum of two samples is required for any pipeline.
- (d) The samples shall be tested for residual chlorine levels and E.coli.
- (e) The pipeline shall be deemed acceptable for commissioning if residual chlorine < 1 mg/L and E.coli <1.
- (f) If a pipeline fails the bacteriological tests, or if it is contaminated after testing, the pipeline shall be disinfected again, and bacteriological testing repeated prior to placing the pipeline into service.

24. Additional requirements

Rural fire-water tanks require a 100mm round thread female coupling. The couplings are to face the road and include a locking mechanism with a key issued to the urban and/or rural fire force.

All rural fire-water tanks shall be identified with a unique number and be the property of the Council Rural Fire Authority. The number and stencil is obtained from Council.

Schedule 6 Appendix 1 – points of supply and typical layouts

Figure 1: With street frontage

Note: Point of supply is the tail piece of the boundary box, meter or service valve regardless of property boundary.

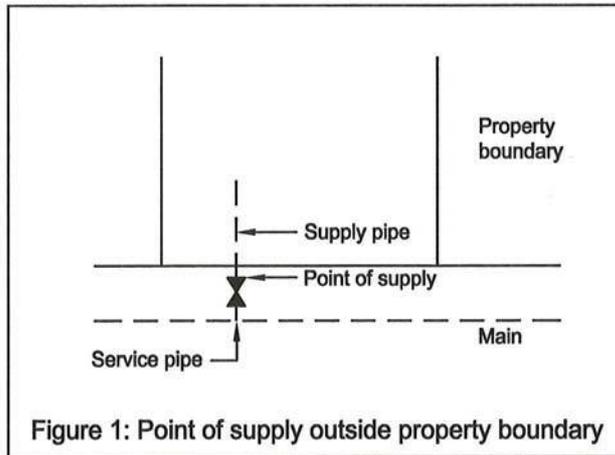


Figure 2: Rear lots on right-of-way (up to two customers)

Note: Point of supply is the tail piece of the boundary box, meter or service valve regardless of property boundary.

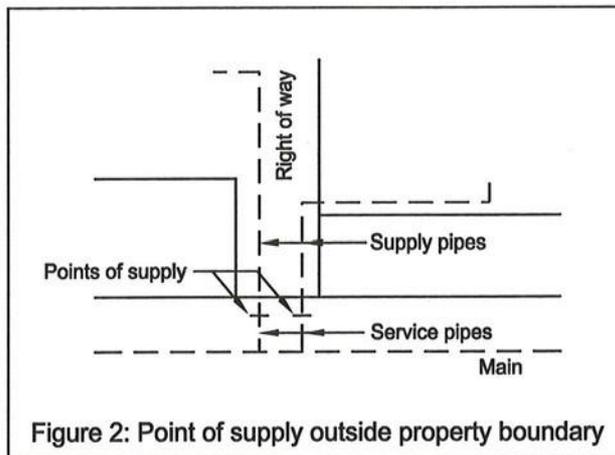


Figure 3: Rear lots on right-of-way (three or more customers) for premises constructed since 2010

Note: Point of supply is the tail piece of the boundary box, meter or service valve regardless of property boundary.

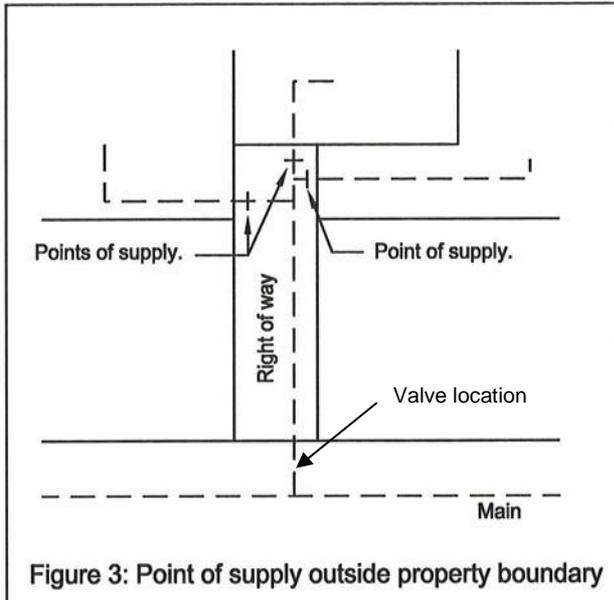


Figure 4: Industrial, commercial, domestic fire and service connections (including schools)

Note: Point of supply is the tail piece of the boundary box, meter or service valve regardless of property boundary.

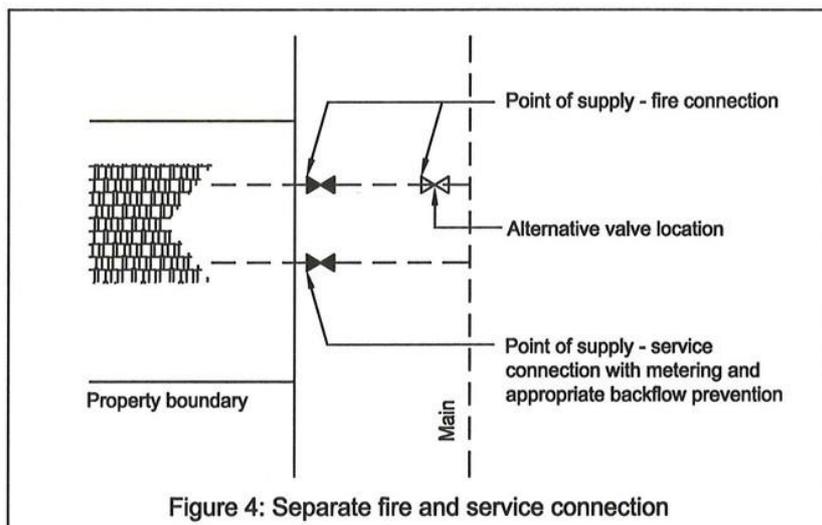


Figure 5: Typical layouts at point of supply

Notes:

1. Point of supply is the tail piece of the boundary box, meter or service valve regardless of property boundary.
2. The New Zealand Building Code may require the customer to install additional backflow prevention devices within the site, which will remain the responsibility of the customer.

Figure 5a:

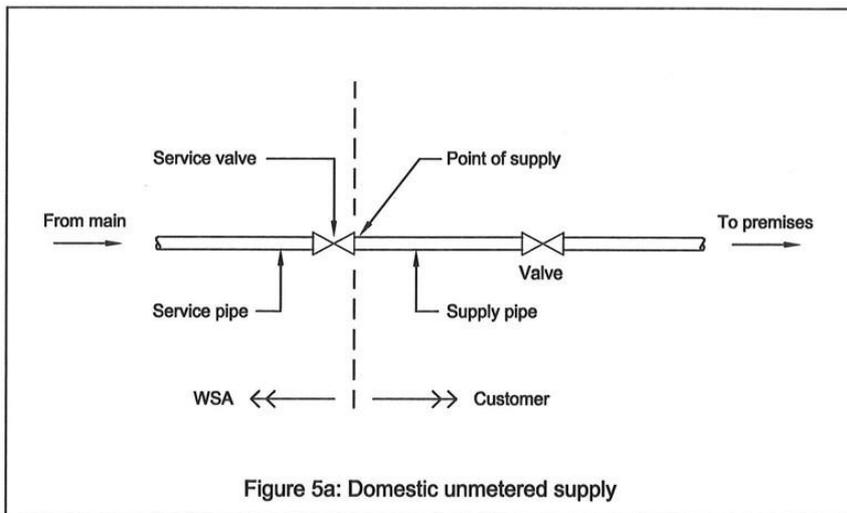


Figure 5b:

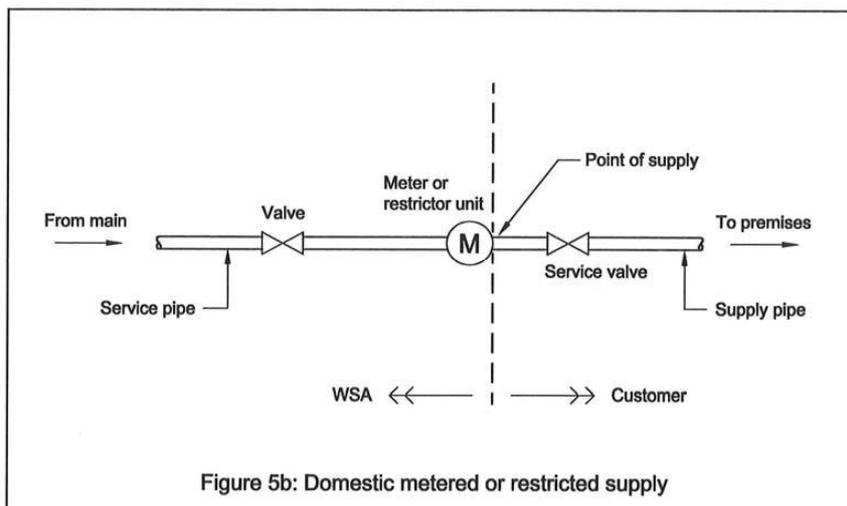


Figure 5c:

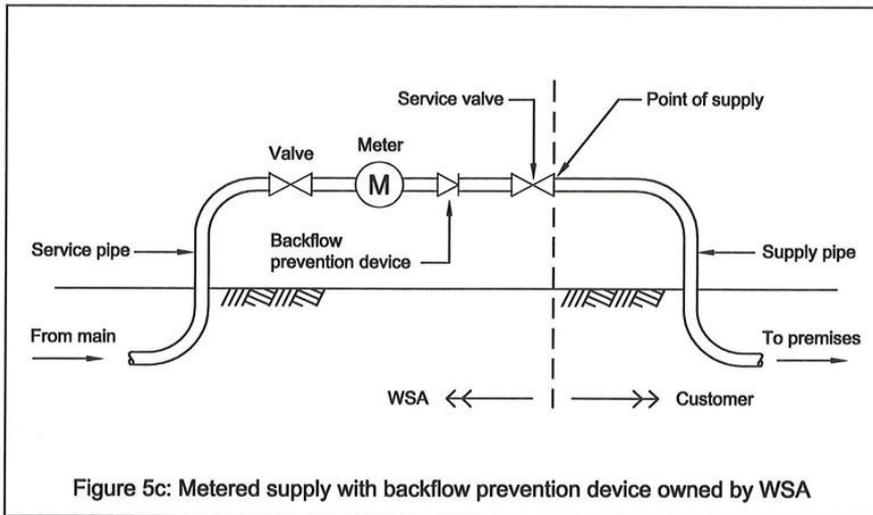


Figure 5d:

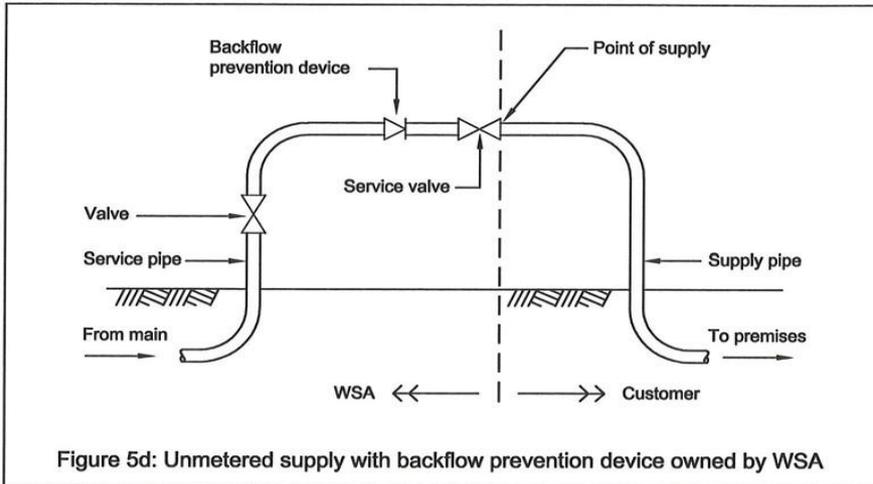
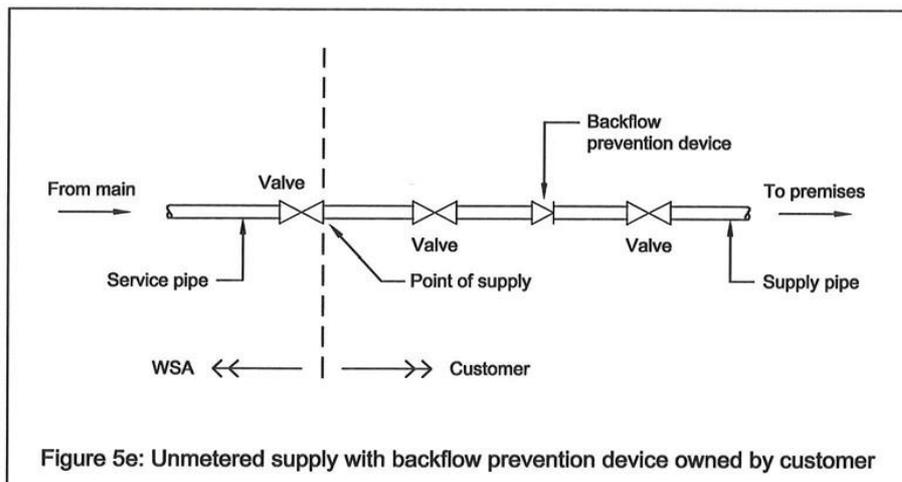


Figure 5e:



SCHEDULE 7

Kāpiti Coast District Council

Altered requirements to

Section 7 NZS 4404:2010 Landscape

The Kāpiti Coast District Council has adopted Section 7 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 7.2.1 Approval**

Amend first sentence:

For all landscapes proposed to vest with Council, consultation with the Council on landscape design and construction is required.

Add further paragraph:

Open space land acquisitions and the extent of new assets included with new acquisitions shall be in accordance with the Open Space Strategy, 2022. Street landscaping shall be in accordance with the design guides relevant to the subdivision or development.

2. **Clause 7.2.2 Environmentally-responsive design**

Add further paragraph:

Low Impact Urban Drainage Design (LIUDD) approaches should be considered when undertaking landscape design. LIUDD elements shall be designed and constructed in accordance with the Council's *Low Impact Urban Design and Development Stormwater Guideline* or other approved design guide. Appropriate planting shall be included with the features used.

3. **Clause 7.2.4 Ecological functional and aesthetic opportunities**

Add to (a) Ecological:

(ix) Can expand ecological corridors/islands where contiguous with eco sites.

4. **Clause 7.3.1 Location**

Replace the first sentence of the second paragraph with:

Infrastructural services should be planned in a way that supports good landscape outcomes and be cross referenced with landscape design so that the location of trees and plantings and the integrity and operation of services are each not compromised by the other.

Add additional paragraph:

Where a specimen tree is planted in close proximity to underground services, network utilities or pavement, a 'root guard' shall be installed in accordance with the manufacturer's specification and requirements.

5. **Clause 7.3.6** *Species selection*

Add the following at the beginning of the clause:

Species selection shall be through engagement with Council officers in relation to the particular built and natural characteristics of the site. Useful guides include Council's [Streetscape Strategy and Guidelines](#) and [Growing Native Plants in Kāpiti](#) which are available from the Council.

6. **Clause 7.3.9** *Fencing of reserves*

Add the following to paragraph (a):

The covenant will also specify that fencing on and within 3m of the boundary with the reserve shall be in accordance with the following table:

	Close boarded	Visually permeable*
Passive reserve	700mm	1200mm
Active reserve	1200mm	1500mm

* Visually permeable means that more than 50% of the fence area is not obstructed by materials making up the fence.

7. **Clause 7.4** *Construction and maintenance*

Add to clause 7.4.3 Weeds and litter control:

The application of pesticides must comply with the Environmental Protection Authority's (EPA's) current application standards and controls. Check with the manufacturer, distributor or EPA if you are not sure of the product's classification and control regime.

Add to clause 7.4.4.4:

Unless otherwise approved by the Council, the seed mixture for berms shall be: 85% draught-tolerant, amenity turf ryegrass and 15% red fescue.

Add to clause 7.4.4.5:

Mowing height range is a minimum height of 50mm and maximum height of 100mm except that grass swales shall have a minimum height of 100mm.

8. **Clause 7.4.11 Maintenance**

Add to the first paragraph of 7.4.11.1:

The standard maintenance period for landscaping is two years, however this may be varied depending on site characteristics and the nature of the landscape design. The Council shall require a bond to cover possible maintenance requirements with landscaping or planting associated with a LIUDD device. The bonded monies may be progressively repaid as the bond term progresses and key milestones are met, as negotiated with the Council's delegated officer.

Add further clause 7.4.11.1 (n):

Developers should ensure that pest animal control measures (e.g. for rabbits) are in place for the duration of the maintenance period.

Add further clause 7.4.11.2:

Developers are required to ensure appropriate maintenance and replacement is undertaken on an ongoing basis during the maintenance period. Maintenance records should be kept for the duration of the maintenance period and made available at final inspection.

Developers shall be responsible for arranging a final inspection by the Council's delegated officer at the end of the maintenance period to get signoff of final completion.

SCHEDULE 8

Kāpiti Coast District Council

Altered requirements to

Section 8 NZS 4404:2010 Network utility services

The Kāpiti Coast District Council has adopted Section 8 of NZS 4404:2010 with the following additions and/or alterations:

1. **Clause 8.3.2 *Utilities above ground***

Note that sites for above-ground utilities shall be specifically provided for by recessing the front boundary of lots and including the area within road reserve, unless alternatives are approved by the Council.

2. **Additional requirements**

1. Streetlights in rural areas and in environmentally sensitive urban areas shall have antiglare shields fitted or be of a type that restricts light dispersion into the sky.
2. A copy of the Code of Compliance for the complete installation and test certificate for each lighting standard shall be provided to the Council.
3. Where community or small-scale distributed, renewable energy-generating technologies are proposed, a project brief must be submitted for Council approval.

The project brief must include:

- description of the project, nature of existing environment and activities that will be engaged in, land ownership and proposed ownership mechanism
- details of designer and/or installer – names, qualifications, contact details and responsibilities, with the design to be developed by a suitably qualified and suitably experienced person and implemented under their supervision
- details of any construction or installation activities

Land Development Minimum Requirements

- location and timing, and any negative environmental effects and proposed mitigation measures
- summary of consultation (if required)
- description of design and operations including:
 - description of any energy sources to be used
 - infrastructure specifications accompanied by emissions data (if relevant) for facilities, equipment or technology to be used to generate or convert the renewable energy source to electricity
 - capacity of facility, and whether anticipated it will feed back into the grid (national or distribution), with written approval of utility network provider that facility meets its needs (if appropriate)
 - site plan for facility (show all buildings, structures, road, rights-of-way, easements, utility corridors within appropriate distance from facility) and Greater Wellington Regional Council resource consent (if required)
 - any works for collection, transmission, treatment and disposal of hazardous substances
 - planning issues, such as proximity to sensitive receptors (noise or odour in particular), natural hazards, existing natural and district plan features, mitigation measures and contingency planning.
- ongoing monitoring, maintenance schedules including responsible parties and mechanism for ensuring compliance.