



7 June 2023

Invercargill City Council / Southland District Council

SUBMISSION ON PROPOSED SOUTHLAND DISTRICT COUNCIL AND INVERCARGILL CITY COUNCIL SUBDIVISION, LAND USE, AND DEVELOPMENT CODE OF PRACTICE 2023

Thank you for the opportunity to review and provide comment on the proposed combined ICC and SDC land development code of practice. We firstly want to note that we support having a combined and consistent approach between both Councils, and in turn support the necessary changes to the District Plans for both Councils to enable this.

In addition, we support the transition from bylaw to code of practice to allow for more regular updates as necessary to address issues and bring the code in line with modern developments.

Please see below section and clause specific commentary. Note an exhaustive review was not undertaken and we have tried to focus on key elements.

SECTION 2 – REFERENCES AND ABBREVIATIONS

Section 2.2 and 2.3

It is unclear what the purpose of these sections are. A large number of publications are referred to with some publications being updates or replacement documents for others referred in the same list. For example, TP124 has been replaced by GD04, TP10 has been replaced by GD01.

Also, this section refers to Auckland Regional Council TP90 for erosion and sediment control. The ICC stormwater bylaw refers directly to the Environment Canterbury Erosion and Sediment Control Guidelines.

It is recommended that the code of practice is aligned with the stormwater bylaw.

It is recommended that this document list is reviewed for correctness and completeness.

2.4 – Definitions

It is suggested to include a definition of Vehicle Crossing being kerb / vested road to property boundary and Accessway being road corridor boundary to lot. We note clients tend to get confused by these terms when reviewing consent conditions.

SECTION 3 – GENERAL REQUIREMENTS AND PROCEDURES

Section 3.2.10.2 – Notification of Construction Programme

This clause requires notification in writing to the Council before completing a wide variety of tasks. It is noted that this may potentially become onerous. It is recommended that Council considers their role in

inspection of the works to avoid duplication with professional advisors' roles in providing quality assurance. This is likely best done on a case by case basis through the consenting and approval of the design therefore this clause could be amended to generally read that inspection and hold points will likely be required at key junctures of the project to allow for independent inspection.

Section 3.2.5 – Datum and Coordinate Systems

No horizontal datum is specified within this clause. It is expected Council would require all horizontal coordinates shall be supplied in New Zealand Transverse Mercator 2000 (NZTM 2000) projection.

In addition see below specific comments for each:

- Southland District Council: New Zealand Vertical Datum 2016 (NZVD2016). Please specify if a geoid model has been used with this datum, if so, which one.
- Invercargill City Council: The ICC Datum of 100 metres below mean sea level (Bluff Vertical Datum 1955/Dunedin–Bluff Vertical Datum 1960). This potentially will create differences as these two datums differ slightly. Suggest for Invercargill that a single datum is selected. In addition, ICC Datum is 100 metres **above** mean sea level.

Section 3.2.10.4 Earthworks Construction

Based on the definitions this clause would require a geo-professional to be involved in roading and trench backfilling earthworks. Quality assurance of these works is normally undertaken by a competent person trained in the approved testing method, and reviewed by a suitably qualified Engineer or Surveyor.

Suggest amending the wording to say “competent person, and where required by Council under the control of the geo-professional”

Section 3.2.10.5 Stormwater Construction

This clause states:

On site disposal of stormwater may be permitted where:

(a) No piped system is immediately available or will not be available within 10 years of the subdivision application.

(b) No piped system is available immediately adjacent or within a reasonable distance of the site.

For clarification of what constitutes a “reasonable distance” refer to Section 9.8 of this CoP.

Areas where construction has taken place shall be reinstated to the condition required by Council.

This approach does not align with modern stormwater management practices which generally encourages on-site disposal, in line with low impact design objectives that are also referenced within this code of practice. This is normally done to reduce off-site effects of stormwater. It is proposed that this clause is re-considered to encourage on-site disposal where the sub-surface conditions allow for this (e.g in areas of Te Anau), or that this wording is removed from this clause all together to allow for innovative and environmentally friendly stormwater management approaches to be developed that suit the site constraints and conditions.

In addition to the above the clause wording provides practicality challenges detailed below:

- Subclause (a). This discusses if piped infrastructure is available within 10 years. This does not provide for a interim solution so should be removed.
- Subclause (b). The reasonable distance definition in section 9.8 is 500m. This is a long distance for extension of stormwater network which would impose high cost on development and would essentially preclude on-site disposal in any urban area even where that is a more practical

option. In addition, 500m of network extension would most likely be impractical from a grade perspective and would require stormwater pumping to achieve in many cases.

SECTION 5 – ROADS

Section 5.3.3.4 Vertical Grade pg66

A minimum vertical grade of 0.5% is proposed. It is recommended that a minimum vertical grade of 0.4% is applied in line with the NZS 4404 clause 3.3.1.7. Given the flat topography of Invercargill and portions of the SDC district this provides greater flexibility in design.

The grade requirement is also referenced in 5.3.8.

Table 5-4 Road Design – Cross section standards

The AADTs included in the tables are very low which will result in roads quickly becoming collector or arterial in nature i.e anything more than 1000 vehicles per day is considered a significant arterial in a residential context. These AADT's don't seem to align at all with the route descriptors in table 5-1. It is recommended that this table is reviewed in comparison to table 5-1 and NZS 4404 for completeness and practicality. In addition, it would be worth reviewing the standards against existing street AADT within the network to check the typology being required aligns with what Council want to see within new portions of the network.

Table 5-4 provides no options for shared movement and parking lanes, with the table appearing to always ensure there is a 6m corridor for two lanes of traffic in all cases. This will likely have a negative impact in regard to traffic calming with increases in operating speed. This results in a minimum road cross section including parking of 8.5m even for a cul-de-sac which is wide in comparison with NZS 4404. This table essentially requires 20m corridor essentially for all urban streets, and dual parking bays for even minor roads meaning all roads 11m width.

Overall it is recommended that this table is reconsidered and modified for practicality with reference to NZS 4404 tables.

In addition to the above it is recommended that rural right of ways have a reduced minimum legal width in line with urban requirements where the length is such that passing bays are not necessary. This will allow for less infrastructure for smaller two lot subdivisions.

Table 5.3.4 Pavement Structural Design

Table C5.3.4 requires pavement design by mechanistic design methods for connector / collector class and above. Granular pavement design of flexible pavements using Austroads chart based and empirical methods should be sufficient for these pavements built from controlled sources. Mechanistic design methods are better suited to analysis of existing pavements for optimisation of renewal designs or for pavements that include stabilisation and/or structural layer of Asphalt.

Given the low AADT's included within the cross-section guidance this would enforce expensive pavement design techniques to be used on relatively low volume and low risk roads.

It is recommended this requirement is removed.

5.3.4.2 California Bearing Ratio Tests

In-situ determination of design CBR in non-granular subgrade is generally determined through scale testing on site. Laboratory testing of soaked CBR would normally only be required for high-risk or very

high volume pavements if recommended by a Geotechnical Engineer. It is recommended this clause be amended to this effect to avoid additional costly testing for relatively low risk and low volume roads found within the Invercargill and Southland District areas.

5.3.6.1 Parking Provision

This clause appears to conflict with Table 5-4 cross sections which don't allow for parking to be shared in the movement lane.

5.3.7 Intersection and Alignment

It would be good to include guidance on minimum intersection separation for local roads while allowing for specific design. The Christchurch infrastructure design standard allows a 40m separation between centrelines for intersections where local roads connect to other local roads.

5.3.12.1(g) – Footpaths and Accessways

This states a minimum accessway width of 5.5m, which contradicts table 5.4 for 1 – 6 users (i.e 3.5 and 4.5m legal width specified on this table. This note should refer to table 5.4 for widths.

5.3.12.2 Cycle Paths

In the first paragraph specific minimum widths are referred to for on-road cycle lanes and shared paths. These widths do not align with the later referenced Waka Kotahi guidelines. It is recommended that the Waka Kotahi guidelines are relied upon for determining appropriate widths and that this code of practice does not include specific requirements other than complying with Waka Kotahi guidelines.

5.3.12.4 Berms

It is recommended that the code of practice provides a standard minimum width of berm between footpath and boundary and provides a stronger preference for footpath placement in local streets to ensure consistency across the network. As an example, the minimum berm width between the footpath and property boundary could be 1m, with the berm between the road and footpath variable, but no less than 0.5m unless approved otherwise.

5.3.17.3 Pavement Design

There doesn't appear to be an allowance within this clause for gravel surfacing of rural private ways

5.3.20.4 Side Drains / Water Tables

This clause says "*Such discharges shall be subject to the approval of affected property owners and be shown to be neither diverting catchments nor significantly changing peak flows or flow patterns*". This clause may subject the developer to off-site approvals even when mitigating effects of development and maintaining natural overland flow patterns. Suggest amendment to discharges may be subject to affected property owner approval.

5.4.2.2 Sub-base

This clause refers to a specific permeability that is included within TNZ M/3 notes without the wider context offered by that document. It is recommended that this clause should refer to the recommendations and requirements included within the TNZ M/3 notes and that an appropriate

specification should be developed based on this for approval, unless Council intends to produce local standard specification.

5.4.2.10 Hot Laid Asphaltic Concrete Surfacing

This clause only requires AC series mixes to be paver laid. It is understood Invercargill plants only produce DG mixes. It is suggested that some requirements of paver laying of these mixes in carriageways is included.

5.4.2.12 Concrete

This clause includes an allowance for kerbs to be 20MPa except for crossings and mountable kerb. Generally, all forms of kerb a likely to have vehicle crossing at some point. Based on this is it recommended to avoid confusion and specify 30MPa for all kerbing.

5.4.3 Subgrade Preparation

This clause requires *“The results of such testing or review along with any consequent adjustments to pavement layer thicknesses shall be advised to Council before placing of pavement layers commences.”*.

In practice this would likely be impractical, and Council should empower suitably qualified professionals with knowledge of the approved pavement design to make these determinations on site, with adjustments recorded and provided as part of the as-built assessment.

5.4.12.2 Asphalt Concrete

This clause requires AP40 as subbase for a footpath. It is recommended this is relaxed to a Subbase AP65 where depth allows.

SECTION 6 – STORMWATER

6.2.7 Water Quality

It is suggested to modify this clause as below to include the receiving environment context in the assessment of necessary treatment standards.

Suggested wording is below:

The type of potential contaminants should be identified and then treatment devices designed to address the particular issues in regard to the receiving environment.

In addition to the above Council's approach to stormwater treatment is not well defined within this document or the ICC Stormwater bylaw. It is suggested that Council provide some guidance in this regard by referring to a best practicable option approach, and potentially the targeting of high contaminant generating activities. QLDC have recently updated their code of practice in-line with this by targeting treatment at higher use roading and carpark areas. This was informed by the Auckland approach from GD01 and it's underlying technical documentation. This will avoid high-cost investment in stormwater infrastructure that will provide little tangible benefit.

6.2.7 Climate Change

This section is unnecessarily complex pointing to both RCP 6 and then also a fixed temperature increase of 1.5 degrees. Hirds V4 provides climate change adjusted rainfall tables for various RCP scenarios and

design horizons. In addition, the design horizon of 2050 is not normally used for infrastructure that is expected to have a longer service life of 100 years. Deriving the percentage increase from the 6 hour duration only would underestimate shorter event rainfall intensities and overestimate longer duration intensities.

It is recommended that instead that the code states “HIRDS v4 RCP6.0 2081–2100 scenario tables shall be used for design based on the closest available rain gauge to the site (i.e RCP 6.0 for period 2081–2100)”. This would provide simpler approach that requires less manual calculation and less chance for error. This is done in many other codes of practice in NZ with the Christchurch City Council Waterways Wetlands Drainage Guide rainfall and runoff section being a good example.

6.3.4 System Design

For the primary system attenuation is discussed within this clause. It is suggested that the wording is amended as below to provide further definition around the allowable outflow rates. It is also suggested that this is separated out to its own attenuation requirements sub-section as it may be applicable to both primary and secondary systems.

In addition, depending upon the site, there is normally a requirement to limit the discharge from the site to a particular flow rate. This will need to be defined in discussion with Council as each catchment will have different objectives for attenuation (e.g. stream stability, flooding control or mitigation, pipe capacity limitations etc). The initial starting point for attenuating is typically to ensure the existing peak pre-development flow rate is not exceeded in the primary AEP storms. Further attenuation may be necessary to align with wider catchment time of concentration or other site-specific objectives.

6.3.5 Design Criteria

Within this section a formula for calculation of design storm intensity for a 10%AEP event is included as below:

$$i = \frac{955}{19 + 0.75t}$$

For a 10-minute event this yields a design intensity of approx. 36mm/hr

When reviewing HIRDS v4 historical data in Invercargill a 10%AEP 10-minute intensity is approx. 54mm/hr.

It is recommended that this formula and the following formulas derived from this are deleted from the code of practice as they are historical formula that are no longer representative of current or future rainfall intensities.

6.3.5 Freeboard

It appears that the freeboard requirement has been increased to 0.6m from 0.5m included in NZS 4404. This is conservative when considering that this freeboard requirement is to the underside of building slab and not floor level.

NZS 4404 is not clear for what scale of secondary flow this freeboard requirement applies to. This also conflicts with the requirements of the building code E1 which requires 0.5m to the finished floor level when flow is deeper than 0.1m and is within a road or carpark.

The amended 0.6m would provide for additional freeboard in comparison with the building code requirement of 0.25m assuming a slab depth of 150mm.

It is suggested that further clarification and alignment with the building code requirements is made to provide distinction between minor secondary flow paths where the building code clause would be applicable, and major secondary flow paths where a higher freeboard would be desirable, say over 0.6m³/s.

6.3.6.3 Hydraulic Design

This section refers to using the Colebrook-white or the Manning or the rational formula. The rational formula is to estimate runoff. This is not used for hydraulic calculations of pipe networks etc so should be removed from this section.

6.3.8.8 Rainwater tanks

This is a standard clause from NZS 4404. This does not consider re-use of rainwater for potable use in rural areas where reticulated supply is not available. It is suggested that wording is amended to acknowledge this.

6.3.10.7 Inlets and Outlets

Refer to our response to Section 3.2.10.5. The limiting of on-site disposal of Stormwater as worded in this clause is not practical or in-line with the other content of this code of practice.

Table 6-5 Acceptable pipe materials and Standards

The table is not clear on what materials are approved for. Council's preferred materials are not clear either in terms of material and strength rating. It is recommended these tables are updated with clearer guidance, and that an approved materials register is maintained by Council.

SECTION 7 – WASTEWATER

7.3.5.1 Design Flow

The design flow formula included based on 0.7l/s/ha for residential flows will yield high wastewater flow rates that would not be representative of new development. It is understood this is a historical flow rate used for assessing existing portions of the Invercargill network that were made up of earthenware pipe materials that experienced high levels of inflow and infiltration.

On all recent developments this formula has not been used. It would overestimate wastewater volume impacting any pumping systems, and also overestimate flow providing inaccurate velocities within the network providing false information for determining appropriate pipe grades.

It is recommended that the alternative design parameters included within this clause are made the default ones, and a note is included that if assessing historical networks and systems that Council may advise on alternative parameters if known, or flow monitoring may be required if necessary. In general the flow demand in per person per day should be set rather than a range provided to ensure consistency in applications and approach.

7.3.7.9 Clearance from Underground Services

This clause is direct from NZS 4404. It is recommended that provision be included for reduced clearances that are included in Christchurch City Council Infrastructure Design Standard Part 9. This provides more achievable clearances for flat topography encountered in the Invercargill and Southland Districts.

Generally, the main clearance item that is challenging is water mains compared to gravity wastewater and stormwater. Often the 0.5m vertical separation is impossible to achieve especially when comparing water mains to gravity laterals.

7.3.11 Pumping Stations

Bullet point 3 stipulates the peak flow rate per person for design at 1m³ per person per day. For consistency it is recommended that the peak flow rate is the maximum flow rate calculated for the catchment based on clause 7.3.5.1.

Bullet point 5 stipulates the emergency storage volume based on 220l per person per day for 8 hours average dry weather flow. As above it is recommended that the volume is based on the average flow calculated from clause 7.3.5.1 for consistency.

Bullet point 6 requires pump stations to have an approved and controlled overflow system. Modern pump stations generally are not able to achieve an approved overflow system to a stormwater network. Instead this risk is managed through emergency storage, backup pumps, generators etc. On this basis this clause could be amended to include a risk assessment of overflow to identify where the system would surcharge and controls to minimise this.

There is no standard reference to WSA 04 standard for design of pump station. There is also no approved suppliers / package systems included within the code of practise. It is recommended that these are included if possible.

7.4 Method of Disposal

Statement (a) states on-site disposal may be permitted if a pipe system will not be available within 10 years. This does not provide for what measures can be taken while that property awaits a future planned network. It is recommended this statement should be removed to avoid preventing development based on potential long term asset planning.

Statement (b) may require long pumped networks which may not be practical. It is suggested that this is amended to provide more flexibility based on specific design.

7.5 Private On-Site Disposal Systems

This clause states the below:

If ground conditions are considered to be marginal in any way Council will require a specific design, based on-site investigations, to be submitted at the time of subdivision application.

It is recommended that this clause is amended to define what is meant by "marginal". On-site disposal systems are designed based on the household that is discharging to it. On this basis only on-site investigations and a typical design could be provided. It is recommended this is reflected in the wording.

7.7.3 Reinstatement

This clause requires reinstatement to a better standard than the original condition or as required by Council. This is an undefined clause that is left to interpretation. Suggest this is removed or a performance based factual definition is included to avoid disagreement or misinterpretation.

SECTION 8 – WATER SUPPLY

8.3.5.12 Connection to the Council's reticulated water supply

As per commentary provided for clause 7.4. Statement B may not be practical from a headloss standpoint.

8.3.6.1 Clearance from Underground Services

As per commentary provided for 7.3.7.9

8.5.3.4 Tracer Wire

This is a standard NZS4404 clause. Does Council require this with modern as-built requirements? In practise we have not seen tracer wire used much.

General

It doesn't appear that there is guidance included for rainwater collection supply for single dwellings. This is not well defined within the building code either. It is suggested that some recommendations be included, even if just referencing the applicable standards with which these systems should be designed to e.g. ESR HE4602 The selection, operation and maintenance of individual household water supplies 2021

SECTION 9 – NETWORK UTILITY SERVICES

9.6 Positioning of Lateral Connections

Within this clause depth of connection at the property frontage is set. These depths conflict with depth requirements elsewhere in the code of practice for Stormwater and Wastewater. It is recommended these are updated to be consistent.

There is a requirement for a vertical riser to be included for stormwater and wastewater laterals for identification. The standard drawings show an end cap with a stake for identification of location, and typically as part of the building code works a vertical riser is installed for cleaning access. It is recommended that this is clarified within the document.

STANDARD DRAWINGS

General

There appears to be inconsistency between text of the document and the drawings. For example Sump size vs calcs within the document. It is recommended that the drawings are reviewed against the text of the document.

In addition, it appears there is a lost opportunity to update detailing through review of other authorities standard drawings e.g scruffy dome rural sumps rather than flat top grates. It is recommended the existing drawings are reviewed and compared to other authorities drawings to update and include missing details.

R2

Standard service locations are shown relative to the road boundary. In practise this does not function well with the kerb lines shifting based on the road cross section. It is recommended locations are based on

relativity to the kerb or carriageway e.g. water main 1m from kerb edge, wastewater main located in the road centre line etc.

R5 and R5a

Standard kerb profiles should be checked against local contractor kerb moulds. The standard kerb in R5 and R5a conflict. It would be better to have a single option.

D3 and D4

D2 detail appears to be missing which would show a lateral without inclined riser (lateral and main matching invert)

The detail of the boundary painted stake and position does not align with the text within the code of practice that required lateral to be extended into the property and a vertical riser to be installed to the surface. Depth of service minimum shown also doesn't align with text within the code of practice.

D4 shows full incasement of the lateral pipe with reinforcing. This is excessive if using suitably strong PVC (SN8 and above) which can be backfilled around.

D12 to D21 Manhole details

All manhole lids are shown as H0 loading at 150mm thick. The Hynds hyspec manhole system lids for HN-H0-72 loading are 200mm thick. Suggest this is amended to specify the loading requirement rather than the thickness.

All manhole details appear to show the use of in-situ bases. It is common practice to use pre-cast flanged bases. It is recommended to include standard drawings for pre-cast bases and pipe connections and corbals to pre-cast manhole bases. Standard examples are available from the CCC CSS and other Council codes of practice.

Yours faithfully
BONISCH CONSULTANTS LIMITED