Part 2: General Requirements

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2.1 Referenced Documents

Planning and Policy

- The *Christchurch District Plan (District Plan)* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/christchurch-district-plan
- Resource Management Act (RMA) (1991)
- Building Act (2004)
- Local Government Act (2002) and Local Government Act 2002 Amendment Act 2014
- Heritage New Zealand Pouhere Taonga Act 2014
- Health and Safety at Work Act (2015)
- Wildlife Act 1953
- New Zealand Building Code (Schedule 1, Building Regulations 1992)
- Christchurch City Council *Long Term Council Community Plan - Our Community* Plan Christchurch O-Tautahi 2018-2028 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/long-term-plan-and-annual-plans/ltp/
- Christchurch City Council *Safer Christchurch Strategy* 2016 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/safer-christchurch-strategy-2016
- Christchurch City Council *Climate Resilience Strategy* www.ccc.govt.nz/assets/Documents/Environment/Climate-Change/Otautahi-Christchurch-Climate-Resilience-Strategy.pdf
- Christchurch City Council *Integrated Water Strategy* www.ccc.govt.nz/assets/Documents/The-Council/Plans-Strategies-Policies-Bylaws/Strategies/Integrated-water-strategy.pdf
- Christchurch City Council *Christchurch Transport Strategic Plan* (2012) www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/transport-strategic-plan-2012
- Greater Christchurch *Urban Development Strategy* Update 2016 www.greaterchristchurch.org.nz/background/background-strategy-update-2016
- Christchurch City Council *Sustainability Policy* 2008 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/policies/sustainability-policies/sustainability-policy
- Canterbury Regional Council *Land Use Recovery Plan* 2013 www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/land-use-recovery-plan/
- Christchurch City Council *Christchurch Central Recovery Plan* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/central-city-recovery-plan/ including
    - *An Accessible City: Transport Chapter* www.ccc.govt.nz/transport/road-improvement-projects/aactransportprojects and
    - *A Liveable City: Residential Chapter* https://ceraarchive.dpmc.govt.nz/documents/liveable-city and
    - *South Frame Chapter* https://ceraarchive.dpmc.govt.nz/sites/default/files/Documents/south-frame-addendum-december-2014.pdf
- Canterbury Regional Council *Regional Plans* www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/

- Ministry for the Environment *National Policy Statements* www.mfe.govt.nz/rma/rma-legislative-tools/national-policy-statements
- Ministry for the Environment *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health* including the *Hazardous Activities and Industries List (HAIL)* https://environment.govt.nz/publications/hazardous-activities-and-industries-list-hail
- *Tonkin and Taylor Coastal Hazard Assessment* for Christchurch and Banks Peninsula (2017) www.ccc.govt.nz/assets/Documents/Environment/Land/Costal-Hazards/2017-Coastal-Hazards-Report.pdf
- Christchurch City Council *A City for People Action Plan* 2010 www.ccc.govt.nz/assets/Documents/The-Rebuild/Strategic-Plans/JanGehlAction-Plan-web.pdf
- Christchurch City Council *Suburban Centre Master Plans (Edgeware Village, Ferry Road, Linwood Village, New Brighton Centre, Selwyn Street, Sumner Village, Lyttelton, Main Road, and Sydenham*) www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/suburban-centres-master-plans
- Christchurch City Council *Sumner Village Centre Design Guide* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides
- Christchurch City Council *Sydenham Suburban Centre Design and Character Guide* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/suburban-centres-master-plans/sydenham-master-plan/
- Christchurch City Council *Health Promotion and Sustainability through Environmental Design* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides/
- Christchurch City Council *Large Buildings in Lower Density Living Zones* 1999 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides/
- Christchurch City Council *Urban Design Guides* www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides
- Christchurch City Council *Exploring New Housing Choices www.*ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides/

Design

- Christchurch City Council *Waterways, Wetlands and Drainage Guide, Ko Te Anga Whakaora mō Ngā Arawai Rēpo (WWDG)* (2003) www.ccc.govt.nz/environment/water/policy-and-strategy/waterways-wetlands-and-drainage-guide
- Christchurch City Council *Central City Lanes Design Guide* 2008 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides/
- Christchurch Central *Streets and Spaces Design Guide* 2008 www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/urbandesign/urbandesignguides/
- Christchurch City Council *A Liveable City: Residential Chapter* https://ceraarchive.dpmc.govt.nz/documents/liveable-city
- NZS 3910:2013 *Conditions of contract for building and civil engineering construction*
- NZS 4404:2010 *Land development and subdivision infrastructure*

- *United States National CAD Standard* www.nationalcadstandard.org
- New Zealand Transport Agency M30: 2016 *Specification and Guidelines for Road Lighting Design* www.nzta.govt.nz/resources/specification-and-guidelines-for-road-lighting-design/index.html

Construction

- Christchurch City Council *Civil Engineering Construction Standard Specifications Parts 1-7* (*CSS*) www.ccc.govt.nz/consents-and-licences/construction-requirements/construction-standard-specifications/download-the-css

Where a conflict exists between any Standard and the specific requirements outlined in the Infrastructure Design Standard (IDS), the IDS takes preference (at the discretion of the Council).

2.1.1 Source documents

This Part of the IDS is based on Part 1 of NZS 4404:2010, by agreement, and with the consent of Standards New Zealand

2.2 Introduction

The IDS serves as a basis of compliance for projects carried out by the Council as part of its capital works programme, as well as the subdivision and development of land, where these activities are subject to the Resource Management Act.

This Part of the IDS includes both those components of the design process common to all developments or not restricted to one asset type and those components particular to the subdivision of land.

The provisions of the Infrastructure Design Standard must be read subject to the provisions of the *District Plan* and to any applicable statutes, regulations and bylaws.

2.3 Relationship with Acts of Parliament

2.3.1 Resource Management Act

The Resource Management Act is the principal statute under which the use and subdivision of land is controlled.

The *District Plan* is a resource management instrument with the purpose of achieving the promotion of sustainable management of natural and physical resources, which is the overarching purpose of the RMA.

The IDS serves as a technical compliance manual and, although outside the *District Plan*, its provisions are referred to and given effect through conditions of resource consent and through capital works' project briefs.

2.3.2 Building Act

The Building Act provides a national focus for building control to ensure that buildings are safe and sanitary and have suitable means of escape from fire, and the Building Regulations made under the Act provide the mandatory requirements for building control in the form of the New Zealand Building Code. The Building Code contains the objective, functional requirements and performance criteria that building works must achieve.

Where infrastructural development associated with capital works and the subdivision or development of land involves the creation of structures with associated site works, observe the requirements of the Building Act. Nothing in the IDS shall detract from the requirements of the Building Act or the Building Code.

2.3.3 Local Government Act

The mechanism for requiring contributions under the Local Government Act, through land or cash, is set out in the *Long Term Council Community Plan*.

2.4 Determining Requirements for Consents

The design and construction of utilities carried out as part of a land development or subdivision is controlled by the subdivision and the building consent processes.

The Building Act Part 1 Section 8 includes within its definition of a building "*a mechanical, electrical or other system*" but only if the system is attached to a temporary or permanent movable or immovable structure and "*the system is required by the building code... or if installed, is required to comply with the building code*." The provision of water, stormwater and sewer reticulation within private land, e.g. an access lot or new access, therefore requires consent under the Building Act. Evidence of compliance is provided by obtaining a building consent, carrying out the works in accordance with that consent and the issue of a code compliance certificate by the Council. Producer statement templates are available on the Council website www.ccc.govt.nz/consents-and-licences/building-consents/building-consent-forms-and-guides.

The Council will accept the IDS as an alternative design solution under a Building Consent but only for reticulation which is not covered by an acceptable solution in the Building Code. This enables the IDS to be used to design both private and public systems, removing inconsistencies in standards between these ownership types.

Systems owned or operated by a network operator (e.g. the Council) that are external to a building and are connected to, or intended to be connected to, the building to provide for the successful functioning of the network utility operator's (NUO) system in accordance with the system's intended design and purpose are not included in the definition of a building and therefore are exempt from the provisions of the Building Act. Authorisation to carry out this work is provided through the conditions of a subdivision consent. Evidence of compliance is provided through certification in accordance with Part 3: Quality Assurance.

Figure 1 indicates those parts of a subdivision that remain in private ownership and therefore would be covered by a building consent, and those covered by the subdivision consent and through this the requirements of the IDS. This diagram applies equally to infill, unit title, greenfields or brownfields development.

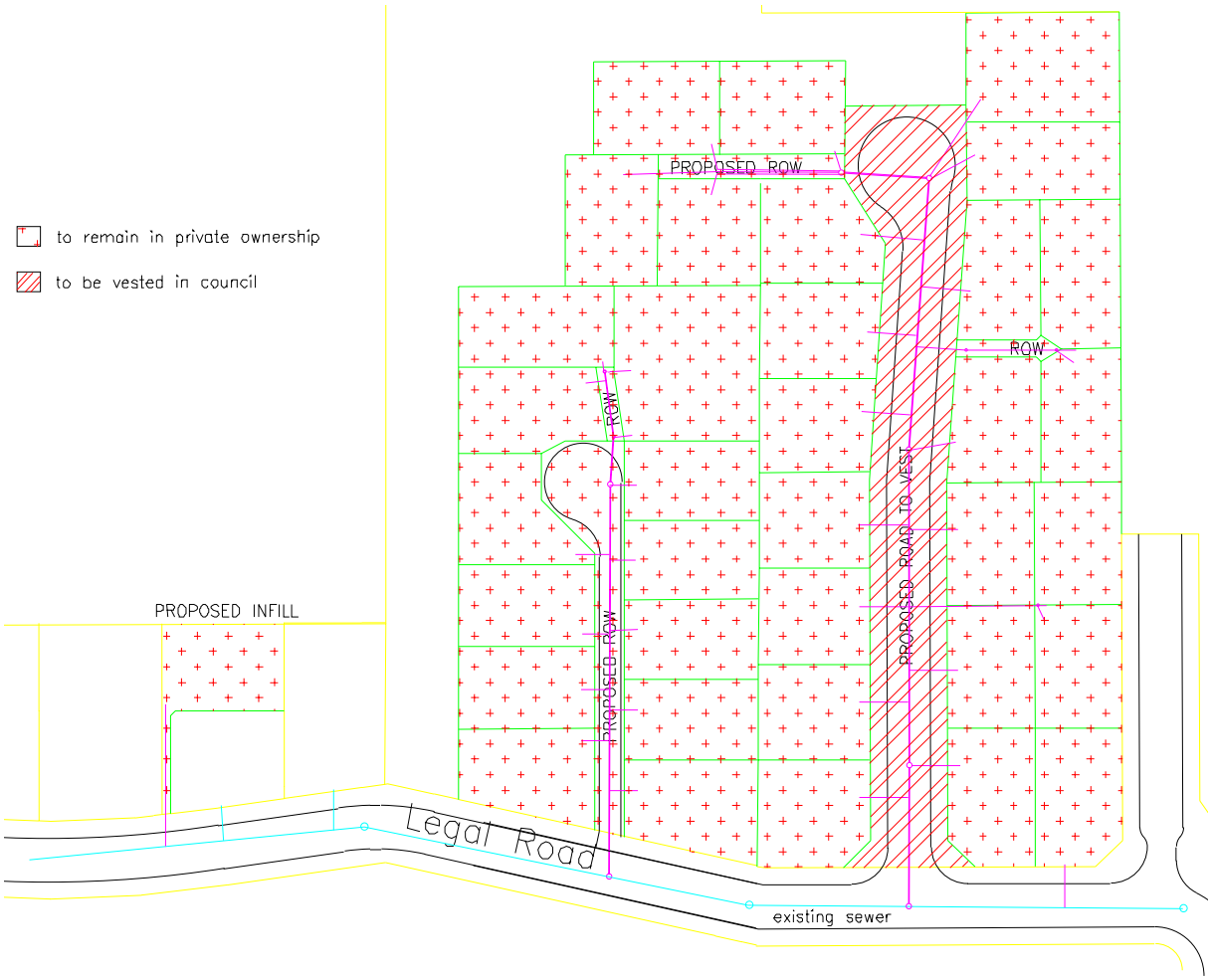

Figure 1 Relationship between public and private ownership

As shown, reticulation of any size installed in private land will remain private, with the exception of residential pressure sewer system laterals, up to and including the boundary kit, and any other reticulation covered by an easement in gross in favour of the Council. The only exception, to the requirement for private reticulation to be installed under a building consent, is for a gravity lateral laid from a main 600mm into a lot. The portion which is private i.e. the 600mm over the legal boundary and within the lot, does not require installation under a building consent. Further information about pressure sewer systems in private property is in clause 6.9.5 – Detailing.

2.5 Expanding on District Plan Requirements

2.5.1 Fees

The Council has a set scale of fees covering most types of subdivision application. Applications are not accepted without the fee being paid. For those types of application not covered by the fixed fees, a deposit is required. The balance of the full cost of processing the application is payable before the release of the Section 224(c) certificate.

2.5.2 Pre-application meeting

Developers and designers of "greenfields' subdivisions that will result in substantial infrastructural assets being vested in the Council, or smaller complex subdivisions on the hills, are strongly advised to request a pre-application meeting at which issues and options can be discussed with the Council.

Submit a concept plan before this meeting.

2.5.3 Future development

Where further development, upstream of or adjacent to the area under consideration, is provided for in the District Plan, the Council may require infrastructure or additional capacity to be constructed to the upper limits of the development.

Make allowance for these requirements where specified by the Council in the consent conditions or project brief.

2.5.4 Balancing landform choices

The final choice of landform for a development is dependent on many factors, which may be specific to the particular site. Figure 2 illustrates the relationship between some of these factors. These include the:

> relationship with surrounding landscapes.

> natural drainage patterns.

> size of the development.

> proposed and existing roading patterns.

> preservation of natural features.

> enhancement of natural features where compromised by fragmentation or reduction due to the development.

> stability of the land.

> function and purpose of the development.

> potential for flooding, erosion and other natural events.

> potential for flooding, erosion and other natural events.

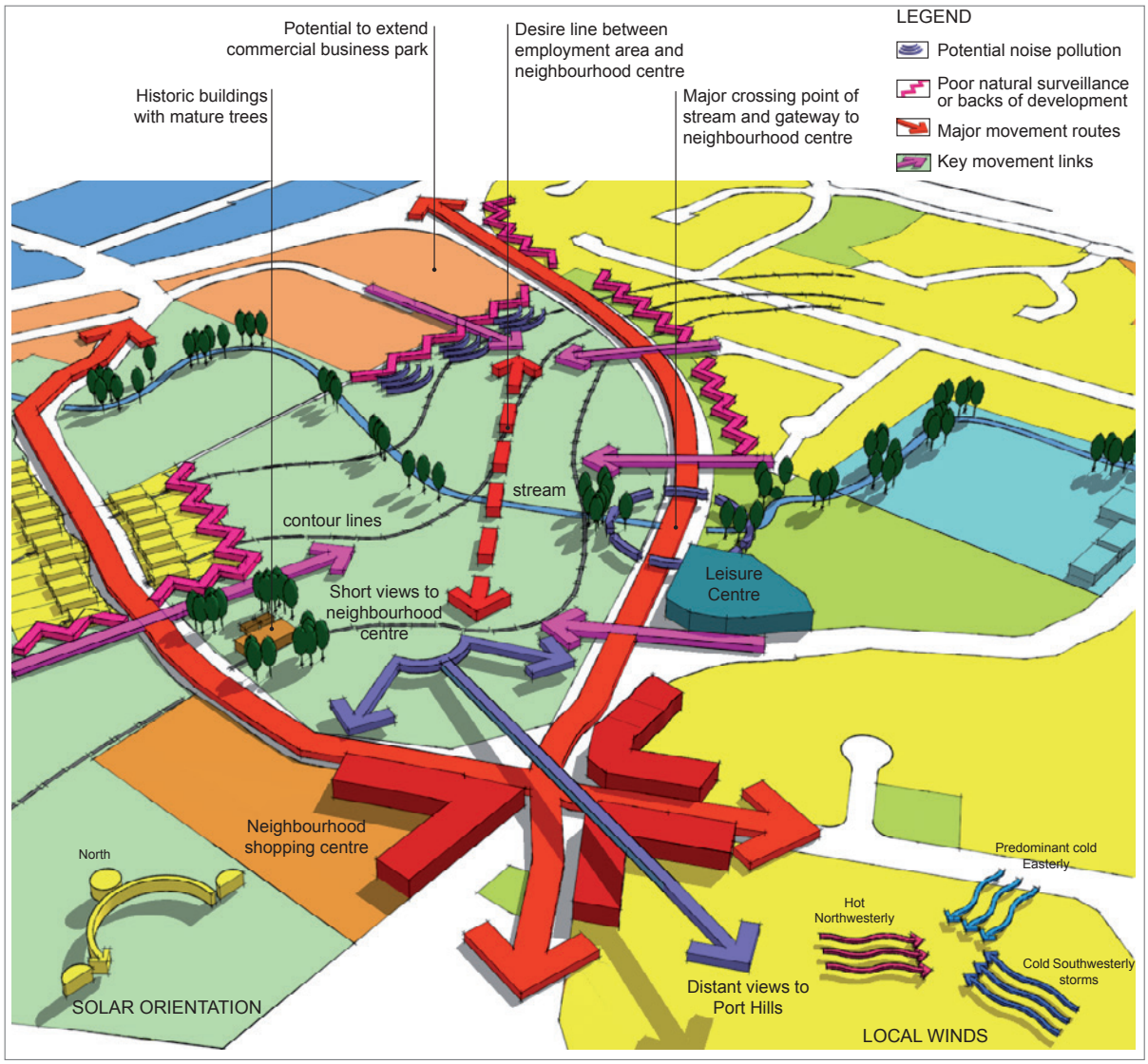

Figure 2 Site analysis

The order of importance of these factors will vary from project to project.

The final choice of landform must represent the most desirable compromise between the development requirements, the preservation of natural features including the existing soil profile, and the natural quality of the landscape. Also refer to clause 4.6.1 – Suitability of landform (Geotechnical Requirements).

2.5.5 Environmental considerations

Planning advice and scoping of potential environmental impacts should be completed during the investigative stage of projects. This ensures that the site and its surrounds are fully understood prior to the commencement of design.

The Council has environmental policies designed to protect and enhance the City's natural environment. It also encourages parties to retain and enhance the natural environment in tandem with development works. When carrying out a design, evaluate its overall impact on the environment for both the construction and operational phases, consistent with legislation,

National Policy Statements, Regional Plans and the *District Plan*. The *Sustainability Policy* elaborates on these requirements.

An archaeological site is any place in New Zealand that was associated with human activity occurring before 1900 and which may provide evidence relating to the history of New Zealand. Any work on any part of these sites will require an archaeological authority from Heritage New Zealand Pouhere Taonga or a resource consent to alter an historic item.

Wherever possible, avoid environmentally significant areas. Some examples of these areas include:

- stands of native vegetation, bushland, habitats of threatened native species.
- waterways and floodways.
- wetlands, swamps, estuaries, sand dunes, foreshore areas.
- community drinking water supply zones
- archaeological sites, heritage item precincts and cultural sites.
- Department of Conservation scenic reserves and protected species.
- ecologically significant sites or habitats including protected trees.
- Maori relics and significant indigenous sites.
- *Hazardous Activity and Industries List* (HAIL) sites including parks, cemeteries, landfill sites and contaminated land.
- areas of aggressive ground conditions, e.g. acid sulphate soils and aggressive ground waters.

The Wildlife Act 1953 protects most native species. The Department of Conservation can issue permits to translocate or destroy species protected under the Wildlife Act, e.g. lizards on the Port Hills, however mitigation and compensatory conditions may apply. It is preferable to avoid impacts on protected species.

The *National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health* ensures land that is potentially affected by contaminated soil is identified and assessed before work commences. Small scale works on confirmed sites may be permitted, but others require a resource consent.

When it is not possible to avoid environmentally sensitive areas, address the following environmental issues in the design strategy and construction methodology and under an Environmental Management Plan (EMP) which complies with clause 3.8.2- Environmental management:

- The environmental impact of the construction;
- Protection of trees and ecologically significant vegetation;
- Protection of waterways and site restoration;
- The use of low impact methods and design solutions such as trenchless technology, rain gardens, eco-sourced native plants, wetlands and other mitigation methods;
- The impact of construction equipment on the site and surrounding area;
- Mitigation of key environmental risks including erosion, sediment and dust control, spills, wastewater overflows, dewatering and excavation and disposal of material from contaminated sites.

Ensure that the appropriate authorisations are obtained from Council, Canterbury Regional Council, Heritage New Zealand Pouhere Taonga and the Department of Conservation and that the work is carried out in accordance with the Council's requirements.

2.5.6 Road name signs

When the development contains new roads, private ways or access lots that require signage, organise the manufacture and erection of any new nameplates and posts, including roundabout chevron signage. Arrange the relocation of existing signage, where the new work affects its location.

CSS: Part 6 contains the specifications for manufacture and installation and IDS Part 8 defines the locations.

2.5.7 Coastal hazards

Council's flood modelling incorporates the 100 year projection of 1.0m sea level rise in the mapping of Flood Management Areas (FMA) and High Flood Hazard Management Areas (HFHMA). Information on design floor levels is available at www.ccc.govt.nz/services/stormwater-and-drainage/flooding/floor-level-requirements/.

Consider the impact of climate change on coastal areas and the upstream effect on groundwater levels and flooding when developing land or infrastructure.

The *District Plan* does not directly address climate change and its effects on coastal inundation and erosion. Supporting information on coastal hazards, including the *Coastal Hazard Assessment Report Stage Two* is available on the Council's webpage. Further explanation and clarification of the interpretation of this information is available from Council. Refer also to the *Climate Resilience Strategy*.

2.5.8 Infrastructure sustainability

Council has adopted a *Sustainability Policy* to help Christchurch become a net positive city. Consider sustainability at the beginning of a project's lifecycle, particularly for large or flagship projects. Sustainable outcomes include management systems, procurement and purchasing, climate change adaption, energy and carbon, water, materials, discharges to air, land or water, land, waste, ecology, community health, well-being and safety, heritage, stakeholder participation, urban and landscape design, innovation.

The effect of the project on these outcomes can be evaluated using online tools. The Infrastructure Sustainability Council of Australia (ISCA) www.iscouncil.org provides one such tool including the one page rating resource spreadsheet 'IS Scorecard v1.2'.

Where sustainability has been evaluated, provide your results in the Design Report to support design decisions. Refer to clauses 2.3.1 – Resource Management Act, 2.5.5 – Environmental considerations and 2.6 Urban Design and the IDS.

2.6 Urban Design and the Infrastructure Design Standard

A useful definition of urban design is:

*'The art of **making places for people**. Urban design is concerned with the **way places work** as well as how they **look**. It concerns the **connections** between people and places, **movement** and **urban form**, **open space** and **buildings**, and the **process** of creating successful neighbourhoods, towns and cities.*

*Urban design is important in creating **sustainable** developments that support **economic** life and **social** integration.'*

This definition highlights the importance urban design has in creating successful places where people want to live, work and play. Urban design skills and principles are commonly used to coordinate various parts of a development to ensure each design decision is complementary to the next, over a range of scales.

Many of the standards in the IDS could simply be 'ticked off' in a piecemeal way but developers are encouraged to think more holistically and to understand how their development fits into the 'big picture'.

New developments should reinforce the broader strategic objectives for Christchurch, which cover a range of scales and detail. These strategies and plans aim to incrementally shape the future growth of Christchurch in a sustainable way (environmentally, socially and economically). The success of these strategies is largely dependent on how well individual developments contribute to the bigger picture. The strategies include:

- *Urban Development Strategy*
- *Land Use Recovery Plan*
- *Christchurch Central Recovery Plan and Addendums* including *An Accessible City: Transport Chapter, A Liveable City: Residential Chapter* and *South Frame Chapter*
- *Integrated Water Strategy*
- *Climate Resilience Strategy*
- *Safer Christchurch Strategy*

The Council also recognises that some places have their own particular character, which may require a different approach to infrastructure design. For some of these special areas the Council is or has prepared place-based plans and may require new developments in these areas to conform to these plans. Check whether the development falls within one of these areas. Place-based plans include:

- *Streets and Spaces Design Guide*
- *Central City Street Trees & Gardens Masterplan (draft)*
- *A City for People Action Plan*
- *Akaroa Township Public Realm Design Guidelines (draft)*

The Council has a number of non-regulatory guidelines on urban design best practice. These are targeted particularly at public space, such as streets and parks that will be vested with the Council. However, the configuration of public space has a direct influence on what can be achieved within private areas, including the mix of land uses, different residential densities, lot layout and built form. Non-regulatory guidelines include:

- *Suburban Centre Master Plans (Edgeware Village, Ferry Road, Linwood Village, New Brighton Centre, Selwyn Street, Sumner Village, Lyttelton, Main Road and Sydenham)*
- *Sumner Village Centre Design Guidelines*
- *Sydenham Suburban Centre Design and Character Guide*
- *Large Buildings in the Lower Density Living Zones*
- *Building Multi-unit Housing (in Living 3 Zones)*
- *Central City Lanes Design Guide*
- *Health Promotion and Sustainability Through Environmental Design*
- *Exploring New Housing Choices*
- *Creating Safer Communities*

The Council encourages designers and developers to seek further guidance, particularly when considering the relationship between the public and private areas. The Council recommends that developers commission professional consultants to carry out the site design or to peer review proposals.

2.7 Requirements for Design and Construction

2.7.1 Investigation and design

All investigation, calculations, design, supervision and certification of the works, as outlined in the IDS, must be carried out by or under the control of persons who:

- are experienced in the respective fields;
- hold appropriate membership in the respective professional bodies;
- have appropriate professional indemnity insurance.

The provisions of the IDS do not reduce the responsibility of those professionals to exercise their judgement and devise appropriate solutions for the particular circumstances of each development or project.

For projects that will affect strategic routes, consult with Christchurch Transport Operations Centre regarding the construction methodology and temporary traffic management needs. This is also advisable but not mandatory for projects on non-strategic routes.

Strategic routes can be found in the *Christchurch Transport Strategic Plan*.

2.7.2 Construction

All works carried out in any development must be done by persons who:

- have the appropriate experience in the relevant areas;
- have the appropriate equipment;
- are approved for that type of work e.g. authorised drainlayers, authorised water supply installers, Site Traffic Management Supervisors. Refer to www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-contractors/.

All construction must comply with the requirements of the *Construction Standard Specifications*.

Erect Notice Boards, complying with *CSS: Part 1* clause 9.0 – Notice Boards, at all construction sites. Where work is being carried out on behalf of other parties e.g. land development or subdivision, include the developer's name in place of the Christchurch City Council name and logo on the signs.

2.7.3 Quality assurance

All quality aspects of the investigation, design and construction must comply with Part 3: Quality Assurance. If any or all of the certificates or other documents referred to in Part 3: Quality Assurance are not supplied, the Council may refuse to accept the work and refuse to issue the certification of the work pursuant to Section 224(c) of the RMA.

2.8 Survey Requirements

2.8.1 Level datum

The level datum used in Christchurch and Banks Peninsula must be the Christchurch Drainage Datum (CDD), as described in clause 5.4.2 – Information to be provided (Stormwater and Land Drainage). Where a Christchurch City Council benchmark is not available within 1.0 kilometre of the site, use a LINZ level mark. Adjust the LINZ datum (which is in the terms of Lyttelton Datum 1937) by +9.043m to convert it to the CDD Datum. State both the source of the levels (the benchmark) and the datum used on the engineering drawings.

2.8.2 Benchmarks

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

Benchmarks must be accurate in the vertical plane to two decimal places with an accuracy of ±15mm to the origin of the level.

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 other substantial concrete structure within the legal road or council reserve.

Provide the following documentation:

- a finder diagram (an example is provided in Figure 3), showing the reduced level to three decimal places e.g. 13.225, 13.250;
- certification from a Licensed Cadastral or Registered Professional Surveyor (a sample certificate is provided in Appendix III – Benchmark Certificate);
- the methodology used e.g. differential levelling, GPS.

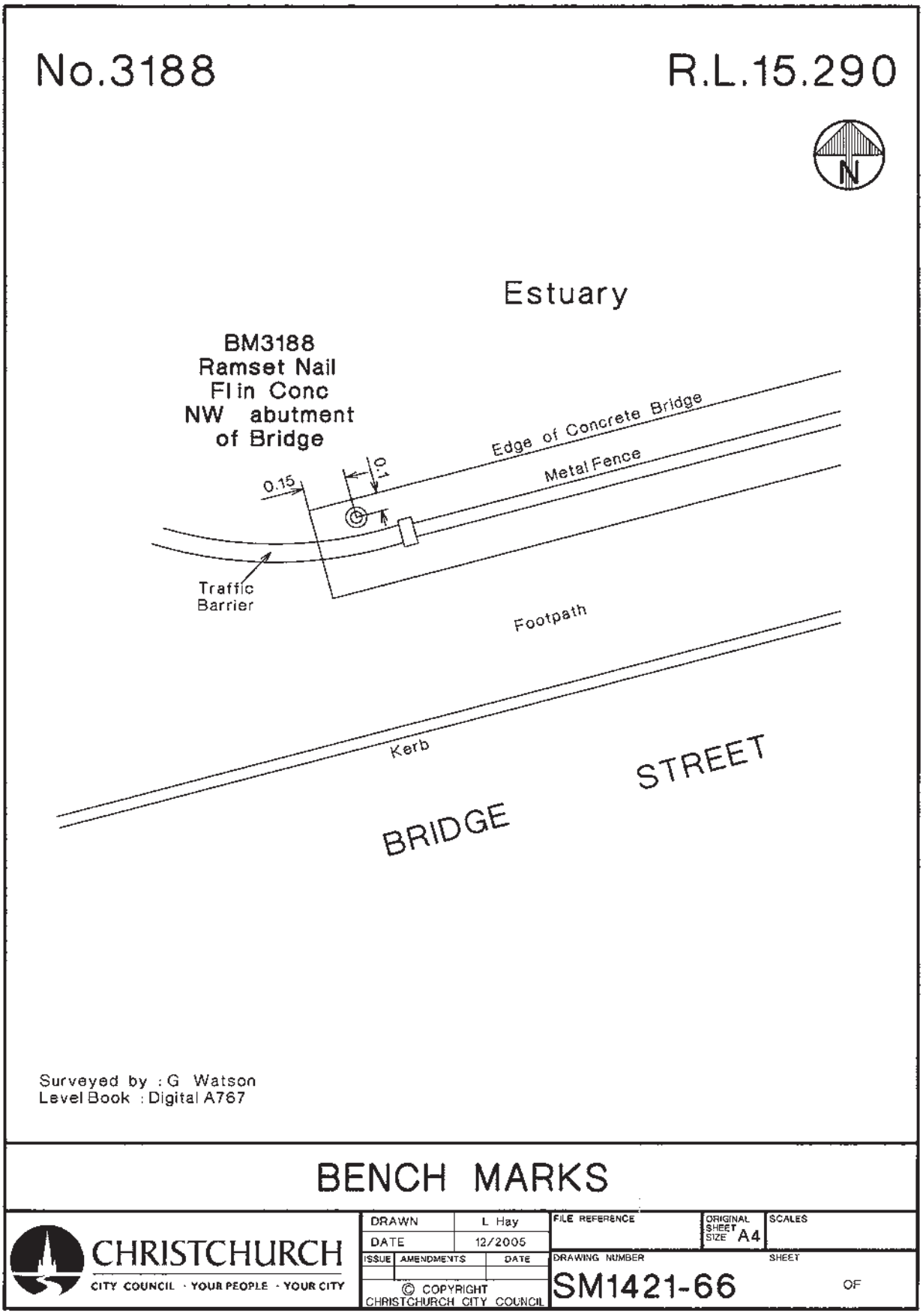

Figure 3 Finder diagram

2.9 Drawings

Engineering drawings must be legible, clear, readable and complete. They must clearly illustrate the proposal and enable both assessment of compliance with the IDS and accurate construction. Produce drawings on ISO - A series format. Follow the draughting requirements attached in Appendix I - Standard Draughting Layout and Format Requirements. *The United States National CAD Standard* provides guidance for electronic draughting requirements.Engineering drawings generally include the following:

- A locality diagram giving the overall layout and location of the works;
- Detailed drawings, longitudinal sections, cross sections and diagrams of the proposed developments and/or works;
- Special details where the standard drawings are not sufficient;
- Benchmarks at a maximum spacing of 650m;
- A north point, preferably pointing above the horizontal (i.e. in the top 180 degrees);
- Standard sheet notes, referring particularly to *CSS*;
- Set out information;
- A service legend, where services are shown on the drawing;
- A planting key or clearly labelled planting, where it is shown on the drawing.

If the project is large, provide a separate landscape drawing. On smaller projects, landscaping details may be shown on the engineering drawings. In both cases, show landscape planting areas on the roading construction drawings, by shading or patterning.

2.9.1 Content of drawings

Show the following information on the drawings:

- The extent of the works showing existing and proposed roads, and the relationship of the works with adjacent works, services and/or property, including adjacent property levels;
- Proposed and existing property boundaries and street numbers;
- Significant existing vegetation to be removed and any special or protected trees, and any areas of heritage significance that may be affected by the works;
- The extent of earthworks, including earthworks on proposed reserves, existing and proposed contours, areas of cut and fill, batter slopes, proposed stockpiles, subsoil drainage, erosion and sediment control measures both temporary and permanent;
- Details and location of existing and proposed stormwater primary and secondary flowpaths;

- The design of proposed roads (and their connections with existing roads), including plans, longitudinal and cross sections, horizontal and vertical geometry and levels, typical cross sections, details of proposed pavement and surfacings, kerbing, berms, footpaths, cycleways, tree planting, road marking and signage and all other proposed street furniture;
- Details and location of existing water, wastewater and stormwater mains and service connections, valves, hydrants, manholes, sumps, bends, tees, thrust blocks, meters and backflow devices;
- The horizontal and vertical alignment and location, including invert levels, physical grades, lengths, sizes, materials, types, minimum cover, cut to invert, position relative to other services of all proposed water, wastewater and stormwater mains and service connections, valves, hydrants, manholes, sumps, bends, tees, thrust blocks, meters and backflow devices, and services that may be reconnected or plugged;
- Details and location of mechanically restrained portions of pipelines, pipeline bridges, pumping stations, reservoirs, intake and outlet structures, headwalls, swales, basins, ponds and the location of surface obstructions, hazards, or other features that may be affected by the works;
- In respect of water mains - chlorination points, pressure reducing valves with upstream and downstream design pressures;
- The street lighting layout showing the location and type of each light, proposed and existing significant road features (e.g. kerbs, property boundaries, planting and traffic management features) and property addresses;
- Details and location of existing and proposed telecommunications, electricity and gas supply, including proposed underground and above-ground junction boxes, transformers and similar equipment;
- The bedding and backfill depths, design compactions and trench restoration details for all underground services;
- Details of proposed landscaping of roads and allotments, and details of proposed reserve development including earthworks, landscaping features, landscaping structures, tree planting, irrigation, hard and soft surface treatment, park furniture and playground equipment. Include details of the ongoing maintenance requirements, using the Riparian Maintenance Guides in Appendix II - Generic Guides for Riparian Maintenance of Part 10: Reserves, Streetscape and Open Spaces where appropriate.

This information may be expanded in the relevant part.

2.9.2 Form of drawings

Provide all drawings in electronic form and as a .pdf. Prepare electronic drawings in Microstation (.dgn), 12Da or AutoCAD format.

All drawings must be legible at A3 size. Streetlighting drawings can be either 1:500 or 1:1000 scale.

2.10 Acceptance of Design

This clause applies to works carried out under subdivision consent.

Include stage boundaries on all plans that are submitted for engineering acceptance where the project is being constructed incrementally.

2.10.1 Documents to be submitted for engineering acceptance

The Council will require a design report to be submitted. Clause 3.3.2 – Design report (Quality Assurance) sets out in detail what is required in a design report.

Submit the design records, incorporating drawings, calculations, specifications, material specifications where not detailed elsewhere, graphical representations and calculations of infrastructure where requested, with the design report. This information should enable the process to be followed easily and should allow for replication of the results.

Include the geotechnical engineer's report on the suitability of the land for subdivision and/or development, including any site investigations.

Each separate Part of the IDS sets out those aspects particular to that Part which must be covered by the design or design report, where relevant.

2.10.2 Cost benefit or life cycle costing

Where required by the Council, carry out a cost benefit or life cycle costing of a proposal. This will typically be for larger or unique projects.

Life cycle costing may be used to consider options within a proposal or a proposal as a whole. In undertaking life cycle costing, consider the initial costs borne by the developer or the Council and the maintenance and replacement costs borne by the future owners and/or the Council. Maintain a reasonable balance between these short-term and long-term costs.

2.10.3 Engineering acceptance

When it is satisfied that the design and design report meets the requirements of the IDS, the Council shall notify the designer that the design and Design Report has been accepted and stamp the plans as accepted. For the purpose of this acceptance, the Council may require amendments to any quality plans, engineering drawings, specifications and/or other documentation and further reports submitted. In considering the design and design report and giving its acceptance, the Council shall act without undue delay.

2.11 Approval of Construction

Work must not commence on site unless and until:

- A resource consent for the work has been issued, except when no such consent is required;
- The Council has given engineering acceptance for works carried out under a subdivision consent;
- The Contractor has received stamped accepted plans;
- The Council has accepted the Contract Quality Plan and Engineer's Review Certificate as detailed in clause 3.3.3 - Contract Quality Plan (Quality Assurance);
- Any other consent required has been granted e.g. NZ Railways Corporation, Department of Conservation, landowner.

2.11.1 Notification of hold or witness points

Hold or witness points form part of the Contract Quality Plan required for each development. The developer or contractor must notify the Council at all 'hold' or 'witness' points and such other times as the Council may determine, for Council's information and to enable audits or witnessing to be carried out.

Give the Council at least one working days notice and adequate access for audits or tests. Audits will be carried out within one working day of notification if possible. The Council will inform the developer of any problems encountered with these audits so they can be addressed at an early stage.

2.11.2 Testing

Any work required to be tested by the contractor or developer in the presence of the Council must be pre-tested and proved satisfactory before test witnessing by the Council is requested.

2.12 Completion of Land Development Works

2.12.1 Defects liability

The defects liability period for all works must be 12 months from the issue of the Practical Completion Certificate. Maintain the works until they are formally taken over by the Council or to a date specified in a bond for completion of uncompleted works. The developer must also remedy defective works, as defined in NZS 3910, over this period.

Establish and maintain landscaping, in accordance with *CSS: Part 7* clause 14.0 - Establishment, over this period or until the landscape establishment bond is released. Establishment includes achieving lawn areas that comply with *CSS: Part 7* clause 13.8 – Acceptance criteria.

2.12.2 Completion documentation

Upon completion of all subdivisional developments, provide completion documentation in accordance with Part 3: Quality Assurance. Additionally, provide evidence that reticulation and plant to be taken over by network utility operators has been installed to their standards and will be taken over, operated and maintained by the network utility operator concerned.

Completion documentation includes, as a minimum:

- completion certificates as per Part 3: Quality Assurance appendices;
- the geotechnical reports, certificates and as-built records required by Part 4: Geotechnical Requirements;
- an up-to-date Environment Canterbury compliance monitoring report which indicates no significant or major non-compliance;
- evidence of a complying post construction safety audit for works on or becoming legal road.
- completion documentation required by Part 11: Lighting;
- as-built records of all infrastructure, where required by the subdivision consent or contract, showing the information required by each Part;
- as-built data, where required by the subdivision consent or contract, for all infrastructure taken over by the Council, in RAMM format;
- project and contract records , e.g. inspection and test plans, non-conformance reports;
- other documentation required by the Council including, but not limited to, operation and maintenance manuals and warranties for stormwater treatment facilities and new facilities involving electrical or mechanical plant; asset valuations for all infrastructure to be taken over by the Council;

When all the conditions of approval that are imposed on a resource consent for subdivision have been met, the Council will issue a Section 224(c) Compliance Certificate to that effect.

2.12.3 Approval of uncompleted work

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

2.13 Bonds

A bond template is available in Appendix IV – Bond Form.

2.13.1 Uncompleted works bonds

Bonds to cover minor uncompleted works, especially where a subdivision or development has been substantially completed, are recognised as an acceptable procedure and will be permitted at the discretion of the Council, except that acceptance of a bond for uncompleted works shall not be unreasonably withheld. Council may consider bonding the establishment of planting, lawns and associated works as uncompleted works. Refer to clause 10.11 – Establishment (Reserves, Streetscape and open Spaces) for further information.

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

The amount of the bond shall be the estimated value of the uncompleted work plus a margin to cover additional costs estimated to be incurred by the Council in the event of default.

APPENDIX I

STANDARD DRAUGHTING LAYOUT AND FORMAT REQUIREMENTS

Provide electronic drawings to a minimum standard that complies with the *United States National CAD Standard*.

1 Drawing base data (existing topography)

Draw existing features in a lighter line thickness e.g. 0.18mm or 0.25mm. Draw standard draughting symbols un-shaded for existing features e.g. □

2 Drawing proposed work

Draw proposed work in a heavier line thickness e.g. 0.35mm and thicker. Use the same line type, to enable clear differentiation between existing features and proposed work. Draw standard draughting symbols filled in for proposed features e.g. ■

3 Labelling

Draw text at the suggested minimum heights in Table 1.

Table 1 Minimum text heights

Titles and drawing numbers	5mm
Subtitles, headings, view and section designations	3.5mm
General notes, material lists, dimensions	2.5mm
Road name	7mm
Side road	5mm
Existing property levels	1.8mm
Buildings	3.5mm

Note: 1) This table is derived from AS/NZS 1100.101: 1992 Table 4.1.

Differentiate between existing features and proposed features by using different formatting:

- lower case or upper case;
- normal format or bold format;
- 0.25mm pen weight or 0.5mm pen weight.

Use the abbreviations in Table 2.

Table 2 Feature abbreviations

Asphaltic concrete	AC
Edge of seal	EOS
Tangent point	TP
Curve Tangent point	CTP

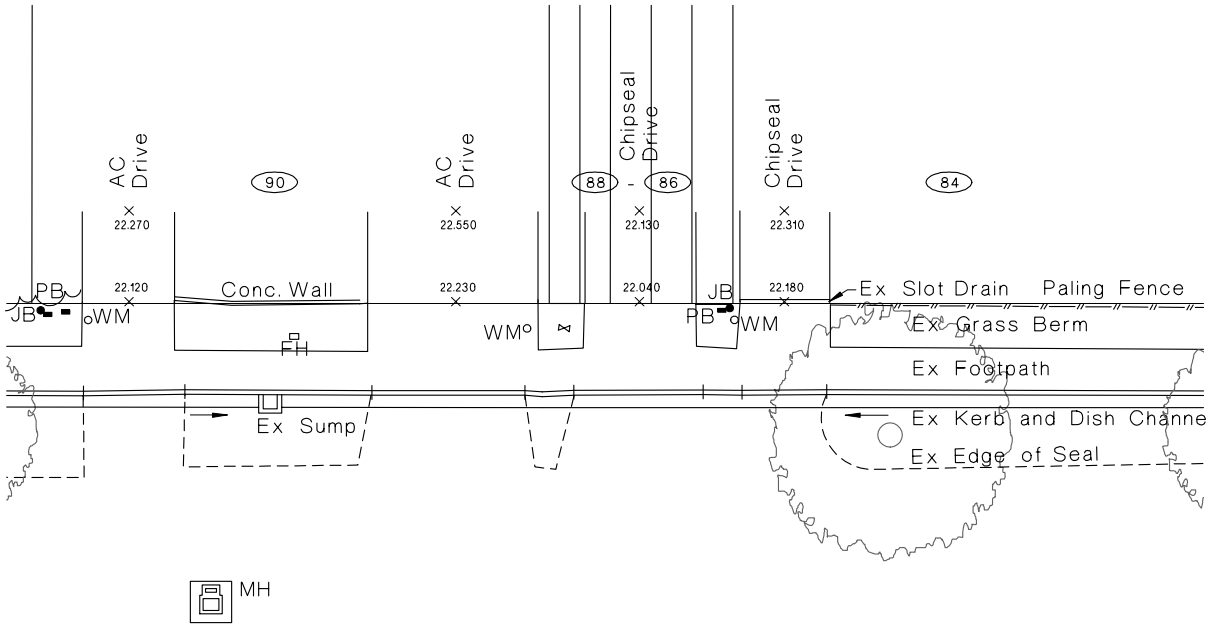

Figure 4 Labelling existing street features (1:200 scale)

Ensure notes do not go through other notes and that leaders do not cross.

Place road names above the north road boundary but not through section boundary lines. Show spot levels on the legal boundary and at least 3.0m inside the abutting private property.

Use standard symbols for trees, lights, service covers and boxes. Typical symbols are shown in the example drawings in section 14 of this appendix. Draw symbols to true scale. Typical abbreviations are shown in Tables 2, 3, 4 and 7.

4 Underground services

Use the line types, colours and RGB values set out in Figure 5. Label all high voltage cables and all fibre optic cables or indicate with a slightly heavier line weight.

SERVICES LEGEND	COLOUR	RGB
SEWER (Gravity)	Red	255,0,0
SEWER (Pressure)	Red	255,0,0
WATER	Blue	50,150,255
STORMWATER	Green	107,255,48
POWER	Orange	255,128,0
TELECOMMUNICATIONS	Purple	128,0,255
GAS	Yellow	194,194,0

Figure 5 Service legend

Label all utility structures or boxes. Label water meters (these include the backflow preventers installed as part of the connection on each side).

Table 3 Service abbreviations

Water meter	WM
Fire hydrant	FH
Power box (above-ground)	PB
Power pole	PP
Sluice valve	SV
Gate valve	GV
Pressure reducing valve	PRV
Backflow preventer	BFP

Note: Label telecommunications boxes, manholes and pillars to suit the development.

5 Drainage

Label all stormwater and sewer pipes with pipe size and flow direction, using similar terminology to that used by the manufacturer to code or classify the pipe e.g. label a 225 diameter stormwater pipe as Ø225 RCRR Class X stormwater or DN225 PVC-U stormwater. Show sewer laterals.

For major pipes 750mm and above, show the outside width of the pipe and manholes, as the manhole lid may not be on the pipe centreline. Show the actual shape of special manholes.

Label all sumps and manholes with the structure identifier e.g. MH with a unique letter and sump abbreviation with a unique number. Structures that are not affected by the work do not require a unique letter or number. Start at one end of the project and number or letter continuously through. Where an existing sump is being modified, draw the proposed sump over it. Label any structures that are being altered in height.

Table 4 Drainage structure abbreviations

Single Sump	SS
Double Sump	DS
Triple Sump	TS
House Drain Sump	HDS
Hillside Sump	HS
Corner Sump	CS
Manhole	MH
Inspection Chamber	IC
Flush Tank	FT
Flush Manhole	FM
Air Gap Separator	AGS

Label new wastewater mains and laterals and stormwater mains and laterals that are being CCTV surveyed using the CPMS number for capital works or the RMA number for subdivisions and new developments as summarised in Table 5.

Table 5 Labelling of new wastewater mains and laterals and stormwater mains

New Asset Type	Labelling
Wastewater main	WW001_CPMSNumber
	WW001_RMANumber[_**]
Wastewater lateral	WWLA001_CPMSNumber
	WWLA001_RMANumber[_**]
Stormwater main	SW001_CPMSNumber
	SW001_RMANumber[_**]
Stormwater lateral	SWLA001_CPMSNumber
	SWLA001_RMANumber[_**]

Notes:

1. Use underscore and no spacing between the characters, 3 digits for the asset number.
2. Remove the backslash (/) in the RMA number, only use the numbers.
3. Characters in brackets are optional to indicate the RMA Stage, written with underscore and a maximum of 2 alpha-numeric characters.
4. Wastewater assets to be named are DN100 mm and larger
5. Stormwater assets to be named are DN225 mm and larger

Refer to Figure 14 for an example of the labelling of new wastewater assets.

6 Landscape

Distinguish existing vegetation from proposed vegetation. Show existing trees, including those to be removed and retained, as well as proposed trees, using the symbols in Figure 6. Accurately show tree locations and, where applicable, use expanded symbol sizes to illustrate the full canopies (driplines) of existing trees that will be retained. Label any protected tree(s).

Figure 6 Landscape draughting symbols

Cross reference all other related designs, including earthworks, underground services, irrigation, and lighting. Show underground services and street light locations on planting plans.

All planting plans must have a plant list. The plant list must include the botanical name, common name, container size and the quantity, and must also include any abbreviations used and planting centres (plant spacings) as detailed in Figure 7.

PLANT LIST

ABBREV.	BOTANICAL NAME	COMMON NAME	SIZE	CNTRS.	QTY
Shrub and Riparian Planting					
Apo sim	*Apodasmia similis*	Oi Oi	2.5L	600mm	30
Art cir	*Arthropodium cirratum*	Renga Renga	2.5L	600mm	24
Car sec	*Carex secta*	Sedge	Rx90	1.2m	5
Fic nod	*Ficinia nodosa*	Knobby club rush	Rx90	600mm	36
Pho coo	*Phormium cookianum*	Mountain flax	2.5L	1.5m	7
Poa cit	*Poa cita*	Silver tussock	Rx90	750mm	28
TREES					
Cor aus	*Cordyline australis*	Cabbage tree	25L	n/a	3
Hoh ang	*Hoheria angustifolia*	Lacebark	25L	n/a	3
Myo lae	*Myoporum laetum*	Ngaio	25L	n/a	5
Pla reg	*Plagianthus regius*	Ribbonwood	25L	n/a	8

Figure 7 Typical plant list

7 Roadlighting

Draw roadlighting as specified in *Specification and Guidelines for Road Lighting Design*.

8 Title blocks

The title block must include the following information:

- A project title, including street address;
- A unique number or identifier, preferably the consent or project number;
- The designer's name, signature and contact details;
- The draughtsperson's name;
- The drawing checker's name;
- The design reviewer's name and signature;
- The stage of work e.g. for acceptance, accepted engineering drawings, construction, as-built;
- The date of preparation and of acceptance;
- The scale or scales used;
- A graphic scale;
- The datum and origin;
- The original sheet size;
- A drawing title e.g. Long-section;
- Sheet numbers, including the number in the set;
- An amendment box, including brief description of amendment and sign off by designer.

The scale for drawings is generally 1:200 but other accepted engineering scales may be used to suit the level of details on the drawings. Scales progress in multiples of 10 e.g. 1:1, 1:2, 1:5 as detailed in Table 5.1, AS/NZS 1100.101.

9 Long-sections

Draw horizontal scales generally to match the plan. Vertical scales may be 1:20 or 1:50, to improve clarity.

Show concrete surround on the pipe long-section. Label structures and vertical curves. Use thicker line weights for proposed work.

10 Cross-sections

Label levels with identifiers e.g. K12.400. Use thicker line weights for proposed work.

Provide a minimum of one fully detailed typical cross-section per sheet.

Show construction depth outlines for roads, paths, grass berms and landscape planting. Label legal boundaries vertically.

11 Road marking drawing

Use the following line types when detailing roadmarking.

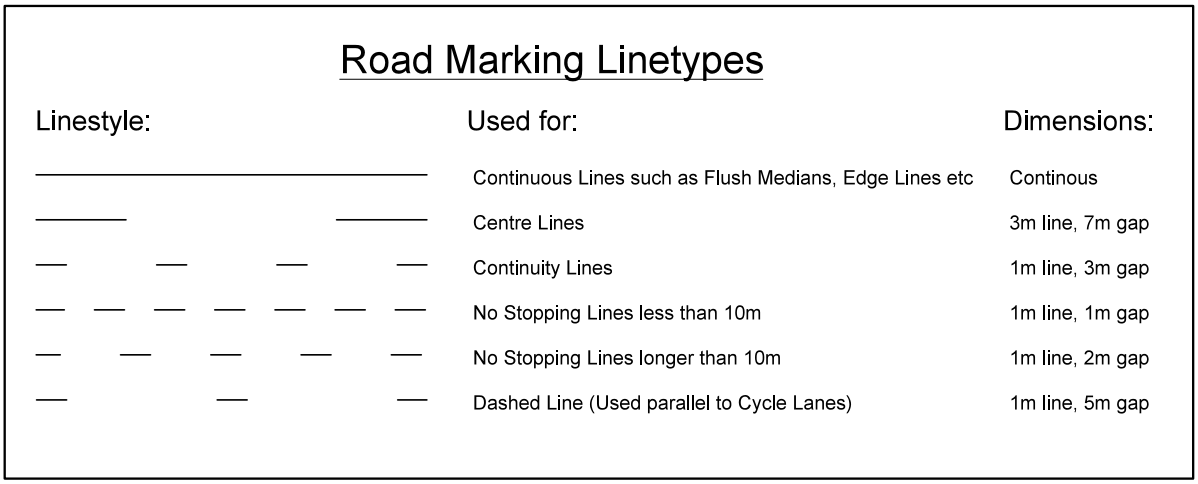

Figure 8 Roadmarking line types

The road marking drawing must show:

- The existing markings to be removed (i.e. sandblasted);
- The new road markings to be installed;
- How the proposed markings mate into the existing markings at the project's extents.

Show roadmarking on a drawing base that is essentially 'as-built' in terms of features such as kerbs and paths. Indicate the type of marker, generally by using the standard symbols and descriptions in Tables 6 and 7..

Table 6 Marker symbols and descriptions

Text Description for drawings		Symbol
RPM	**Reflective Pavement Markers**	
	White Mono RPM	○
	Red Mono RPM	□
	White Bi Direction RPM	◫
	White/Yellow Bi Direction RPM	◧
	Yellow Bi Direction RPM	
KTM	**Kerb Top Markers**	
	KTM	●

Note: Specify numbers, spacings and colours for reflective pavement markers and kerb top markers.

Table 7 Sign types and descriptions

Sign	Text Description for drawings
Bridge End Markers (always used in pairs)	BEM
Hazard Marker	HM

12 Locality diagram

Show the road boundaries and street names. Show the limit of the development. Draw the locality diagram true to the map orientation or at the same orientation as the engineering drawing.

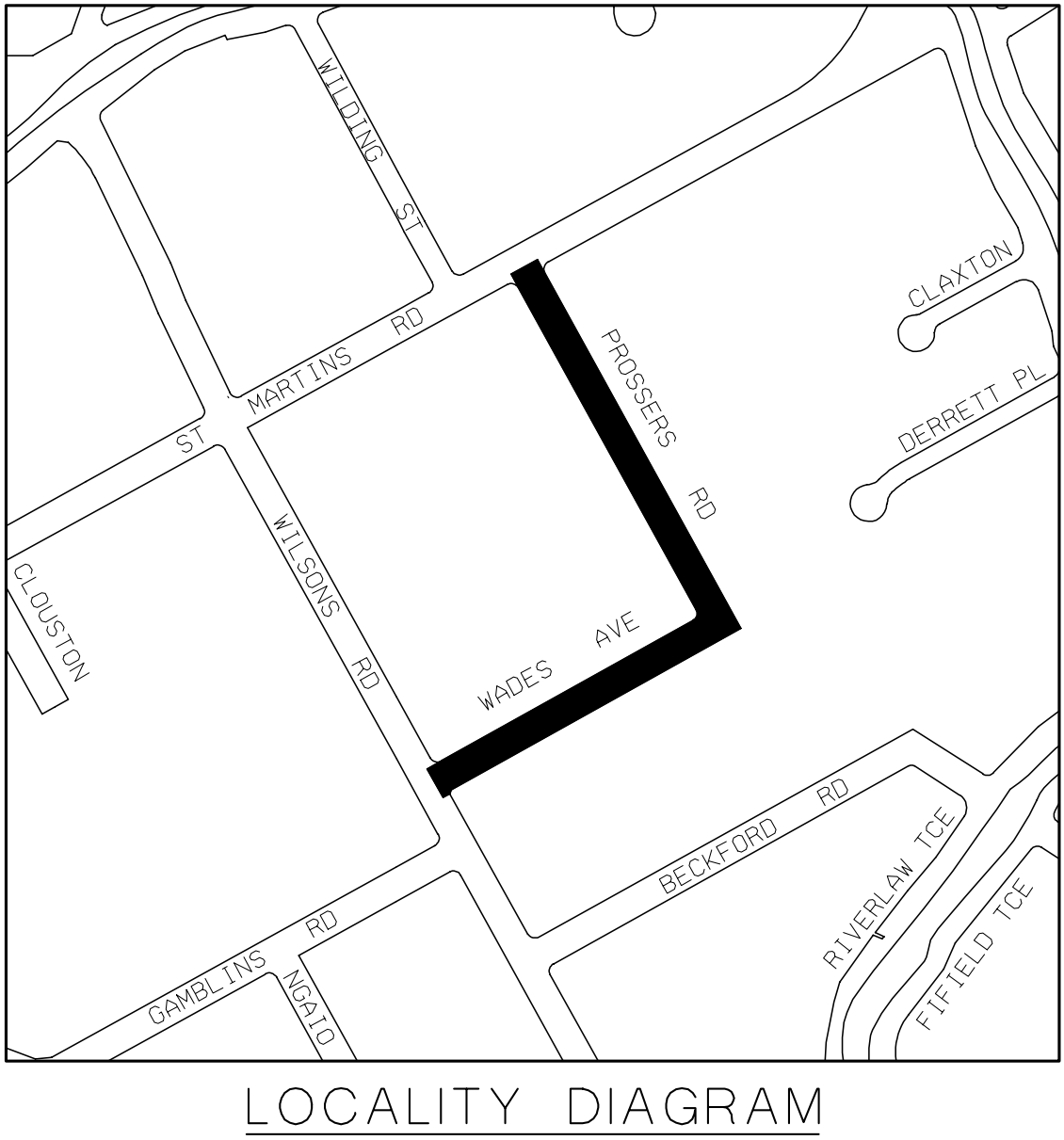

Figure 9 Locality diagram

13 Examples and drawings

Examples of standard drawings follow.

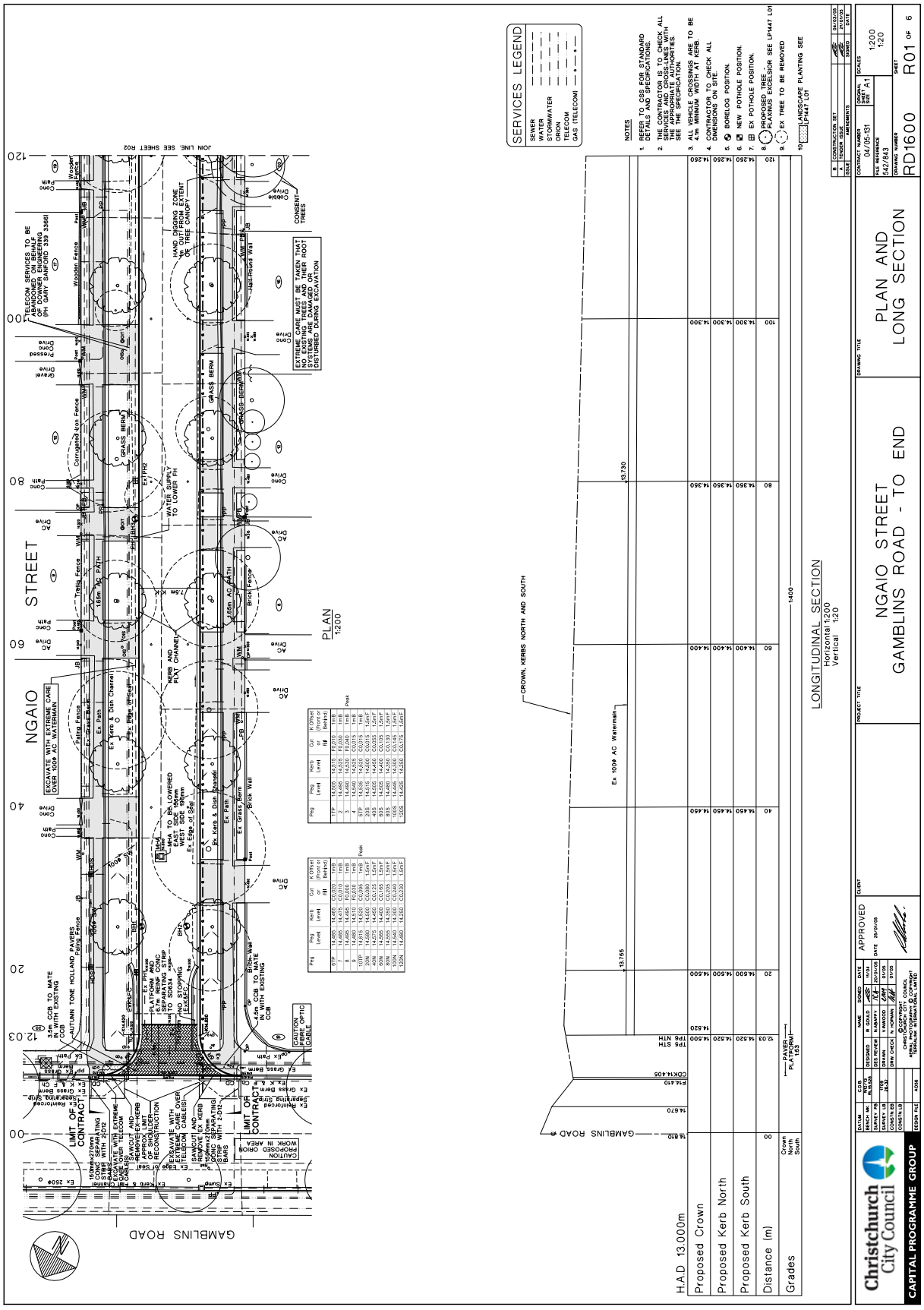

Figure 10 Long-section and paving drawing

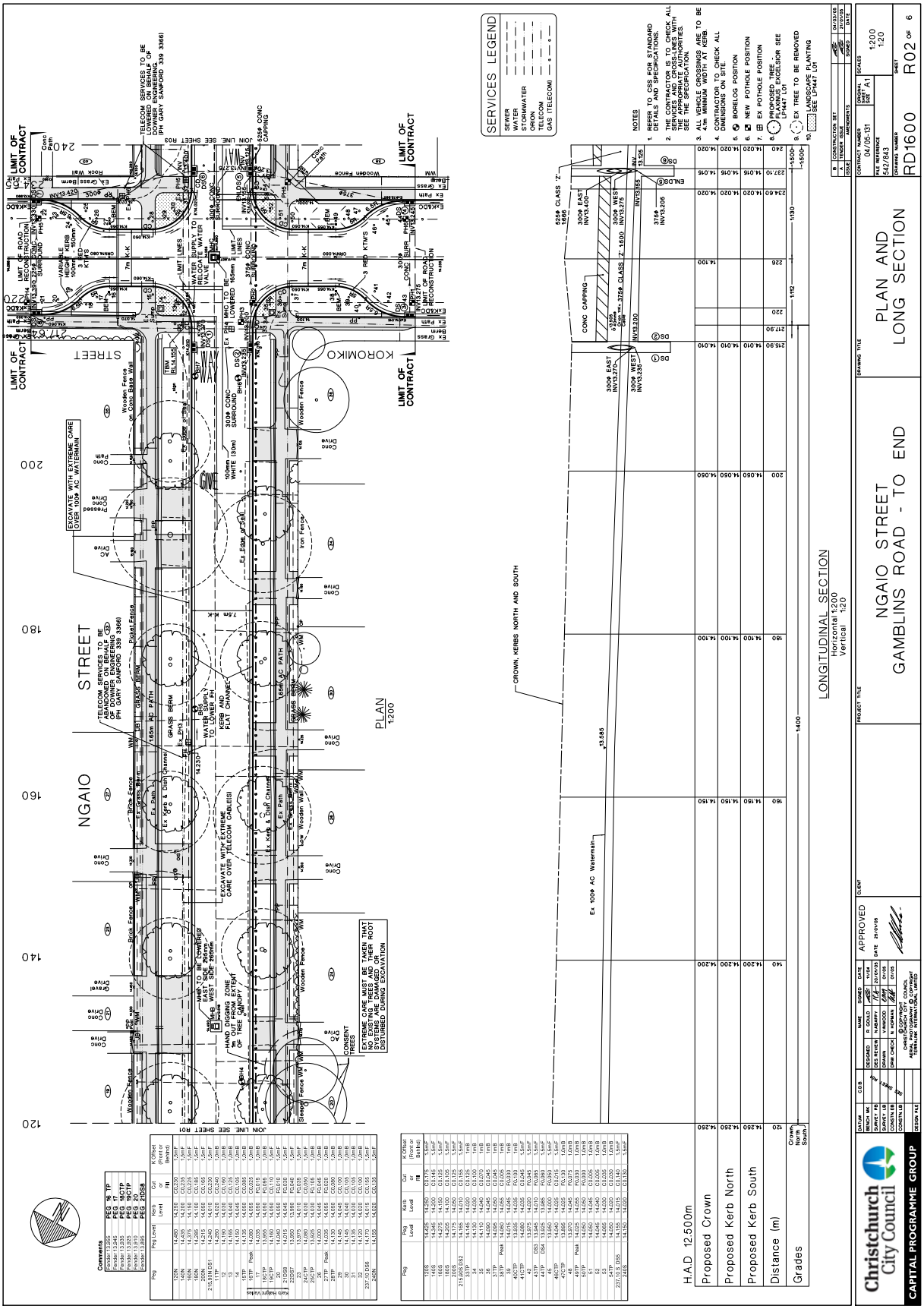

Figure 11 Concrete haunching and kerb setout

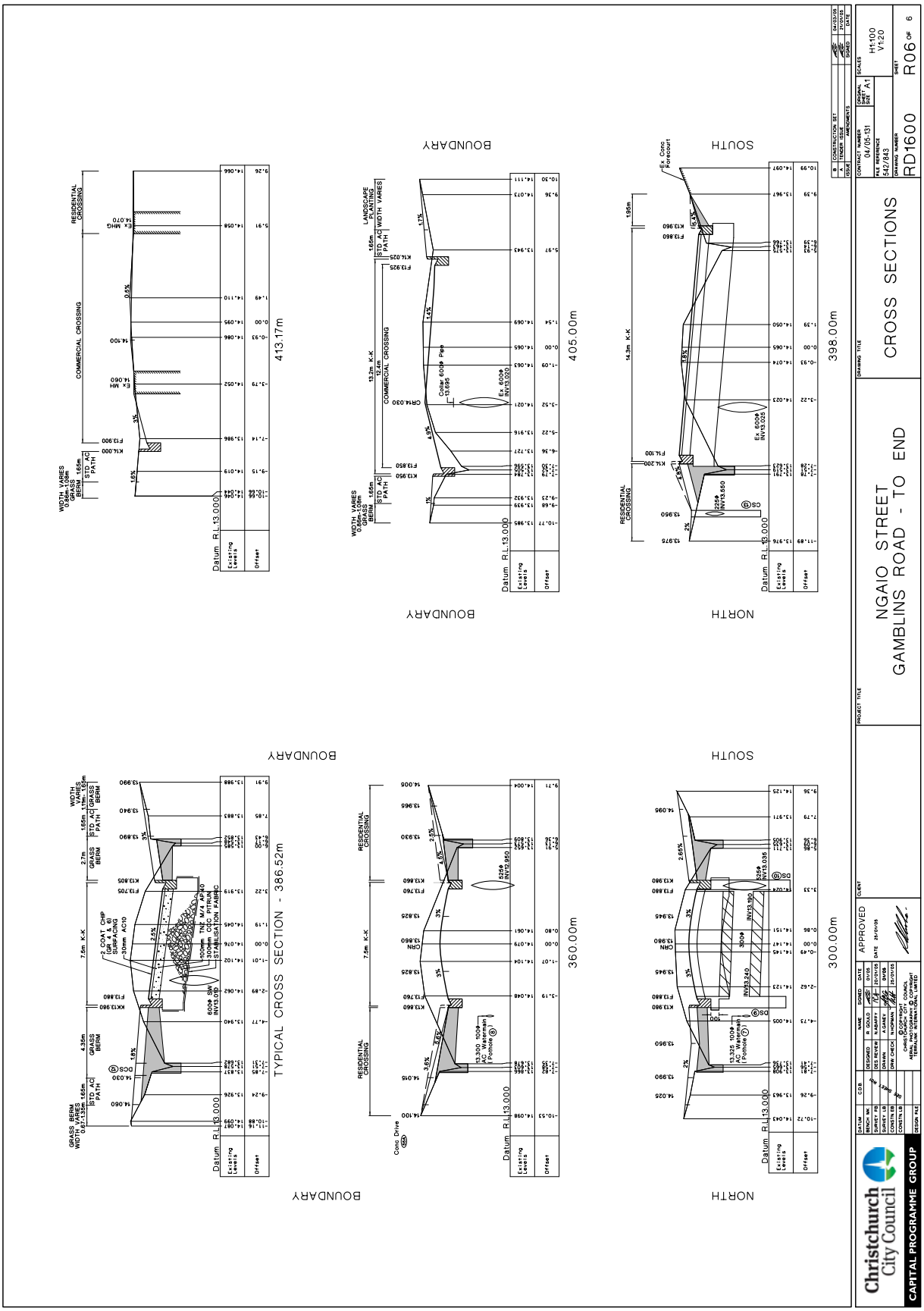

Figure 12 Cross-sections

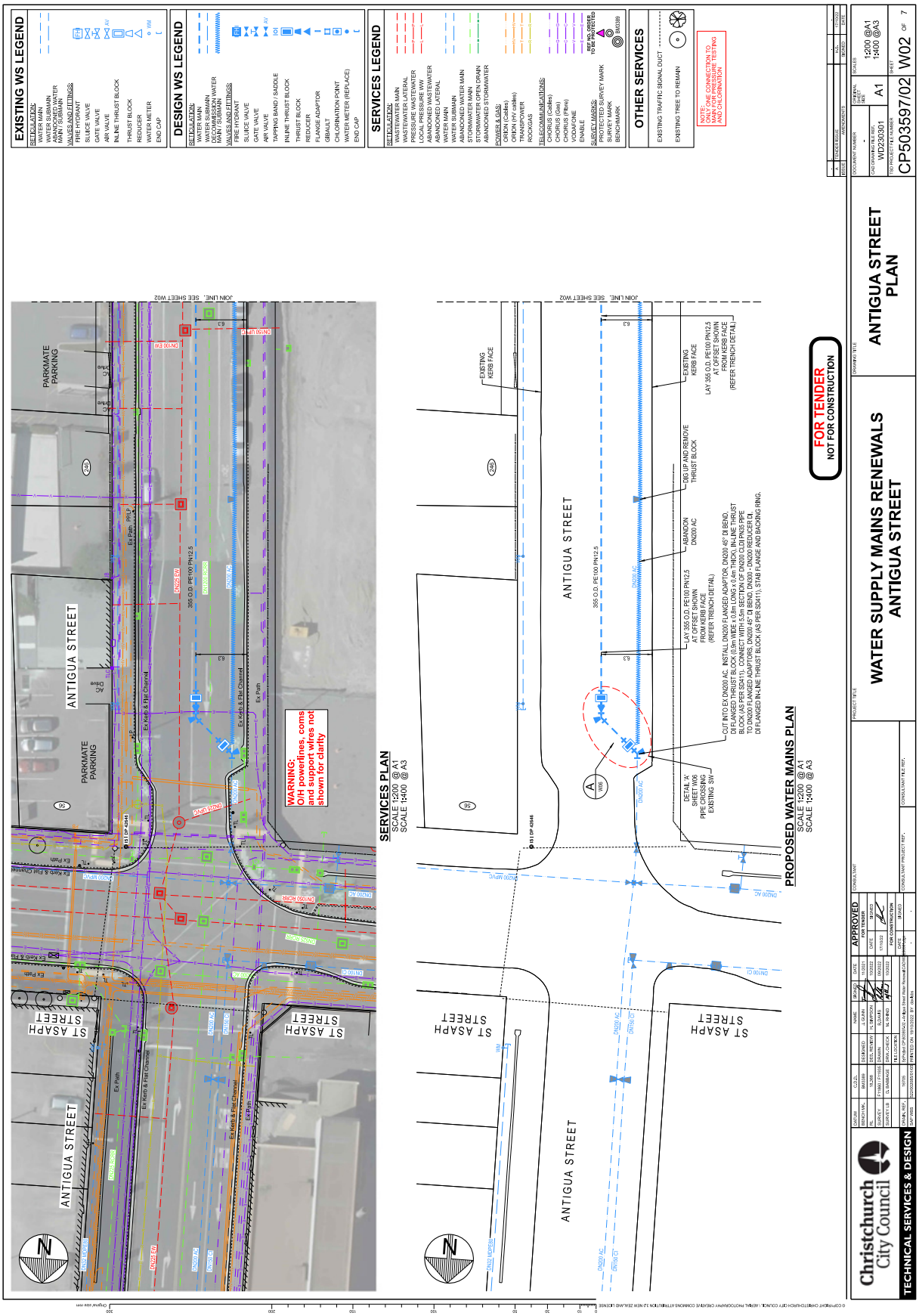

Figure 13 Water supply drawing

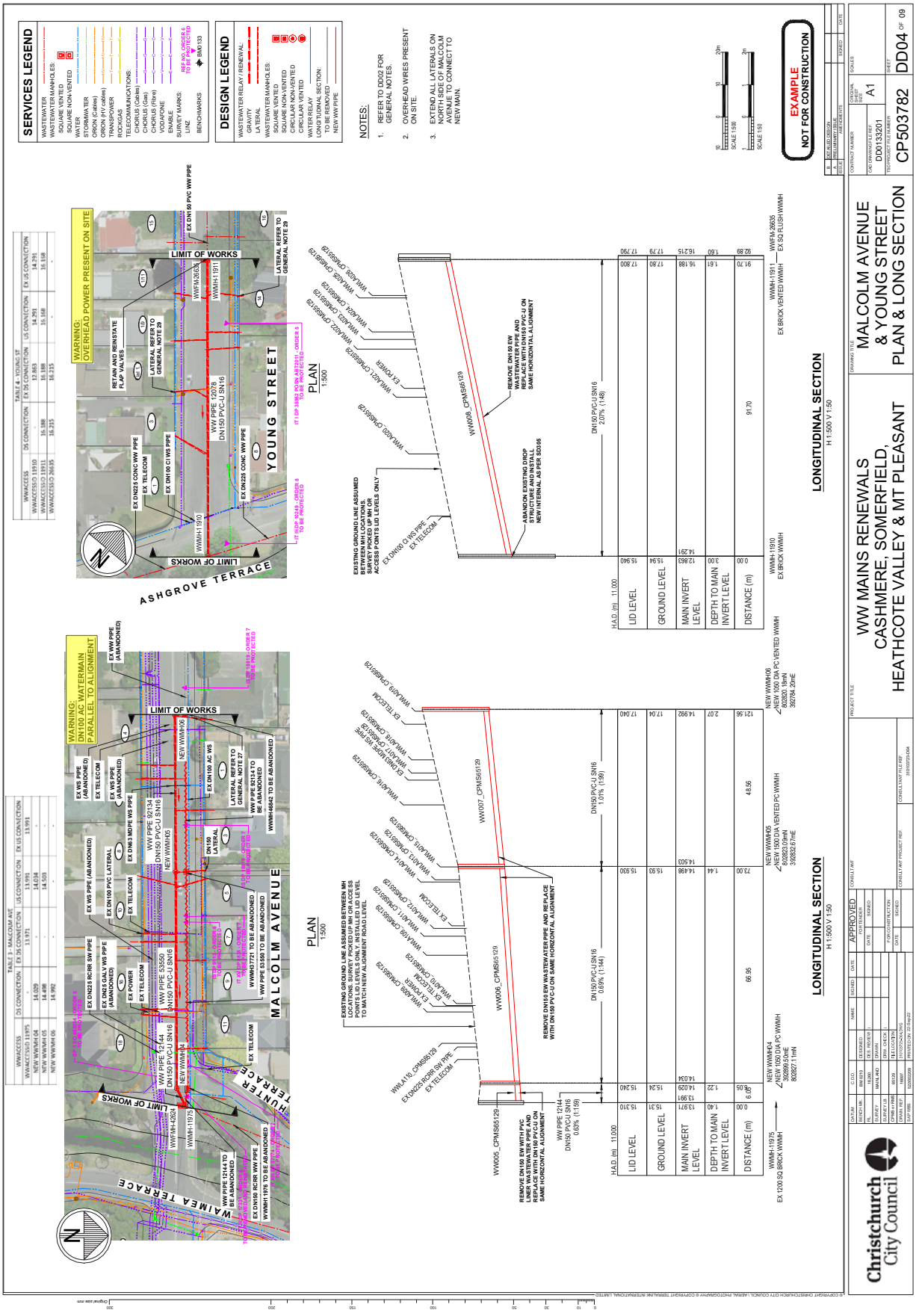

Figure 14 Drainage drawing

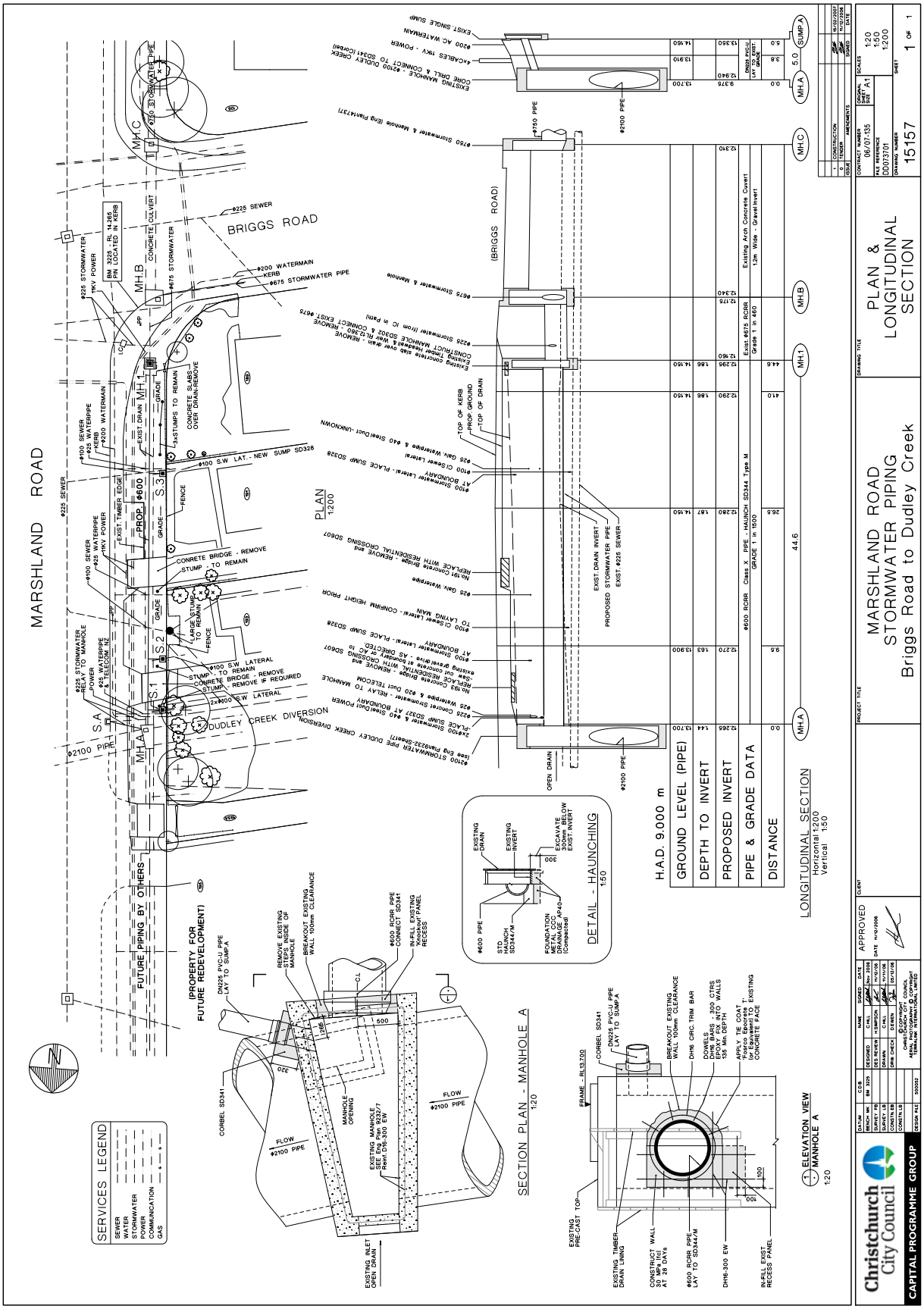

Figure 15 Special drainage details

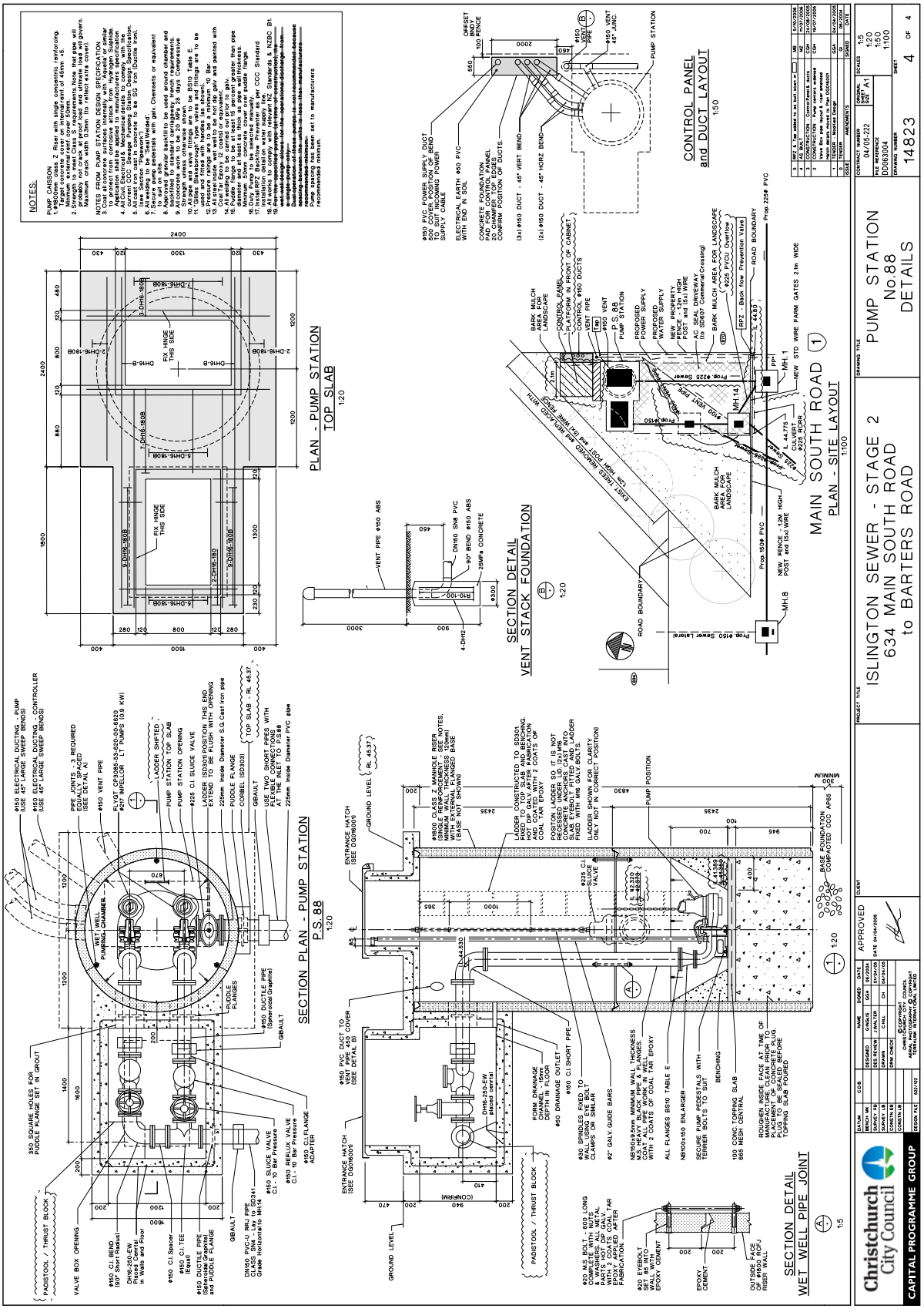

Figure 16 Pump station

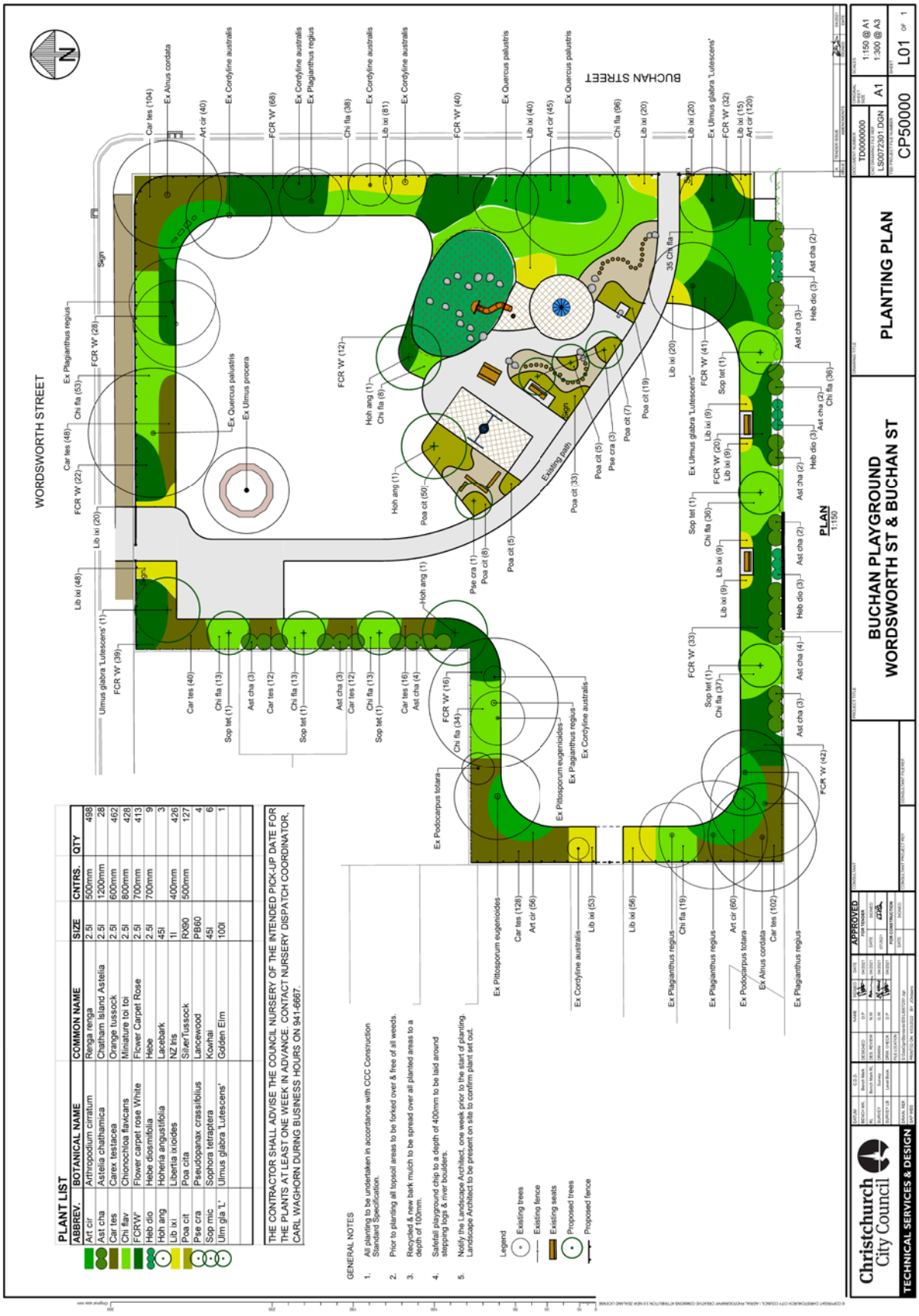

Figure 17 Landscape planting drawing

APPENDIX II

DRAUGHTING CHECKLIST

DRAWING – (LAYOUT)	
Street names and waterways correctly spelt and orientated with correct text size.	☐
Running distances are shown at top of drawing - at right angles to drawing.	☐
Join lines (if any) are shown and labelled.	☐
North point (should be correctly orientated i.e. not pointing down), service legend and standard notes (bottom right hand corner of sheet) shown. Drawing to be labelled with scale.	☐
Leader arrows from notes should not cross one another.	☐
Existing notes and proposed notes do not overlap one another, or the boundary and section lines.	☐
Title block filled out correctly, including sheet numbers.	☐
Any amendment to drawing to be indexed in amendments box as a letter (not number) with small description and date.	☐
Any details or sections to be labelled correctly.	☐
Related drawings cross referenced.	☐
Locality diagram labelled and orientated correctly.	☐
Proposed notes are standard in wording. Benchmark referenced.	☐
DRAWING – (EXISTING FEATURES)	
Existing kerb and channel correctly labelled.	☐
All existing manholes, sumps, fences, grass berms, footpaths, driveways and landscape features are labelled.	☐
Boundaries shown – existing and proposed, including easements.	☐
Property levels or contours are shown over development, at boundary and 3m outside development.	☐
All buildings to be hatched and labelled (e.g. DAIRY).	☐
House numbers shown at correct orientation.	☐
All existing drainage pipes are correctly labelled with flow direction shown.	☐

All existing utilities are correctly labelled.	☐
Existing vegetation, including that to be removed, is clearly shown, in both canopy size and position.	☐
DRAWING – (PROPOSED FEATURES)	
Proposed kerb and channel correctly labelled.	☐
Proposed kerb and flat channel has fender line shown.	☐
All radii on proposed kerb and channel shown.	☐
TP's, CTP's on proposed kerb face have 'tick' shown.	☐
Proposed cutdowns are shown and labelled (particularly at intersections and adjacent to pedestrian islands). Does not apply to standard driveways.	☐
Proposed property/spot levels and contours are 'proposed' weight.	☐
All proposed paths/paving/other hard surfaces are shaded and labelled correctly.	☐
Correct Peg box attached.	☐
Manholes being altered or installed have an allocated letter.	☐
Extent of filling, finished levels shown.	☐
If landscape planting is shown on drawing there must be a landscape planting key.	☐
If there is a separate landscape planting drawing, planting to be patterned and labelled on roading drawing; cross referenced to the landscape planting drawing.	☐
LANDSCAPE DRAWING – (ADDITIONAL TO LAYOUT)	
Proposed features/structures labelled, including furniture/bins/signs/fountains/fencing.	☐
Proposed playground equipment/softfall areas/sports fields/recreational hard surfaces labelled.	☐
Proposed vegetation/plant symbols clearly labelled and/or listed in plant list.	☐
Plant list has correctly spelled botanical names, common names, sizes and quantities.	☐
LONG SECTION (ADDITIONAL TO LAYOUT)	
Proposed kerbs, crowns, edge of seals to be labelled. No existing kerbs, edges of seal, are shown (when required, small sections may be shown for clarity).	☐
Pipe size, class, protection shown, vented manholes labelled.	☐
Longitudinal section to have title below section.	☐

Sump numbers/MH letters correspond to the drawing.	☐
Running distances from easily located point on engineering drawing.	☐
All required grades shown and labelled.	☐
Existing and proposed levels shown, including cuts and fills.	☐
Property boundaries, road intersections, crossing services shown.	☐
Datum, shown to 3 decimal places.	☐
ROAD MARKING DRAWING (ADDITIONAL TO LAYOUT)	
RPM'S and KTM's use the symbols and are correctly labelled.	☐
Correct line types are used for 100 mm WHITE, NO STOPPING, CONTINUITY etc.	☐
Correct line weights used for 'ex lines to be removed'; 'ex lines to remain' and 'proposed markings'.	☐
CROSS SECTIONS (ADDITIONAL TO LAYOUT)	
Every cross section sheet to have at least one typical cross section showing construction in full and labelled correctly with standard notes.	☐
The word chainage should not appear. Cross sections labelled with chainage value only (ie 20.00 m) to be centred under cross section.	☐
Proposed kerb and fender, quarter points, crown, interpath channel, and invert of swales to have levels shown.	☐
Sump numbers/MH letters correspond to the drawing.	☐
Proposed stormwater pipes, sumps and any services which could be disturbed to be shown.	☐
North, south or west and east boundaries to be labelled as such.	☐
Proposed trees and other plantings are shown in relation to underground services, paths and carriageways.	☐
Datum text to be positioned at left hand side of cross section on datum line.	☐

DESIGN CHECK BY: _____ DATE: _____

Appendix III

Benchmark Certificate

ISSUED BY: _____

(Surveying firm or suitably qualified surveyor)

TO: _____

(Owner/Developer)

TO BE SUPPLIED TO: _____

(Territorial authority)

IN RESPECT OF: _____

(Description of benchmark)

AT: _____

_____

(Address)

On behalf of _____

(Surveying firm)

I, _____ a Licensed Cadastral / Registered Professional Surveyor

(Surveyor) (delete one)

hereby certify that the benchmark shown on finder diagram _____

has been installed in accordance with the requirements of the Infrastructure Design Standard and good survey practice, using _____ methodology.

The surveying firm issuing this statement holds a current policy of professional indemnity insurance of no less than $_____.

(Minimum amount of insurance shall be commensurate with the current amounts recommended by EngNZ, ACENZ, TNZ, INGENIUM.)

_____ Date:_____

(Signature of Surveyor)

_____ _____

(Surveyor firm) (Address)

Appendix IV

Bond Form

Christchurch City Council
Conditions Of Receipt Of Cash Refundable Bond

SUBDIVISION REFERENCE: _____

ADDRESS OF ACTIVITY: _____

THE CHRISTCHURCH CITY COUNCIL hereby acknowledges:

(a) Receipt of the cash refundable bond (Receipt No. _____)

(b) That such sum is to be held by it as a cash refundable bond for uncompleted subdivisional works on the conditions set out below.

THE OWNER described below for himself his successors and assigns, hereby confirms and ratifies that the conditions set out below are the conditions upon which he has lodged the said sum and hereby covenants to complete the works listed in the schedule by the date specified therein.

CONDITIONS

1. If the Owner completes all the work listed in the Schedule below to the satisfaction of the Council by the date specified, the sum shall be refunded to the Owner in full.
2. If the Owner does not complete all the said work by the said date the Council, on the Owner's behalf, may carry out or cause to be carried out the said work or such parts as shall not be completed and may apply the said sum towards the cost of so doing. Any surplus after completion by the Council shall be refunded to the Owner.
3. The Council shall not however, be obliged to carry out all or any of the said work and if it chooses to do so the carrying out of such work shall be without prejudice to the Council's exercise of any other rights remedies or powers which it may have against the Owner.
4. Bond monies will be refunded once Council costs attending to the outstanding works and confirming compliance have been recovered. An invoice will be raised in due course for these costs.
5. Bond monies are non-interest bearing.

DATED this _____day of _____

SCHEDULE

THE OWNER: _____

THE DATE FOR COMPLETION: _____

DESCRIPTION OF WORK: _____

BOND VALUE: _____
(Receipt to Account Code SRB)

SIGNED by the said)
)
in the presence of:) _____ _____

Director Director/Secretary

Signature of Witness: _____

Full Name of Witness: _____

Occupation of Witness: _____

Address of Witness: _____

Note:

1. If two directors sign, no witness is necessary.
2. If a director and secretary sign, both signatures are to be witnessed.
3. If the director and secretary are not signing together, a separate witness will be necessary for each signature.