Wellington Water

Regional Draughting Manual for Water Services

July 2024 Version 2.1

Our water, our future.

Document Control

This document was developed for the Hutt, Porirua, Upper Hutt and Wellington City Councils, South Wairarapa District Council and Greater Wellington Regional Council.

Version History

Version	Description	Date	Author(s)
1.0	Approved and issued	02/2019	W Gosper S Luck D Hopkins
2.0	Reviewed and updated to align with refreshed Regional As-Built Specification (RABS), Regional Standard for Water Services (RSWS) and Regional Specification for Water Services (R.Spec)	12/2021	W Gosper S Luck D Hopkins
2.1	Amended to include specific guidance on process drawing specific standards (Appendix 1) with minor formatting updates.	07/2024	G Evans

Document Acceptance

Description	Name	Date	Signature
Prepared by	Greg Evans (Asset Data Analyst)	July 2024	G Evans
Reviewer	P&ID Standardisation Working Group	July 2024	N/A
Approver	Wayne Bird (Team Lead, Data Quality)	July 2024	W Bird

Table of Contents

1. Introduction

The Regional Draughting Manual (ICT_0004) is a guide that primarily provides technical information for the production of drawings for Wellington Water Limited (Wellington Water).

This Manual is to be read in conjunction with the Regional Standard for Water Services (RSWS), the Regional Specification for Water Services (R.Spec) and the Regional As-Built Specification for Water Services (RABS) all available at www.wellingtonwater.co.nz.

1.1 Purpose

This document outlines the objectives and procedures for the preparation of drawings for all engineering disciplines on Wellington Water projects.

The creation of drawings involves creating, maintaining, controlling and sharing reference files and design models (if applicable). This document also outlines the standards and procedures that are to be adhered to.

1.2 Objectives

The objectives of the drawing production are:

1) to accurately portray the design intent;
2) to produce drawings which are consistent with the intended use; and
3) to provide clear, consistent documentation which is easily understood by users and minimises requests for additional information from Contractors.

1.3 Scope

This procedure applies to all drawings and models prepared for Wellington Water and covers:

1) Drawing setup
2) Draughting standards
3) Drawing Issue Sets
4) Printing and issuing of drawings

Drawings created are to follow appropriate best practice, and appropriate company drafting procedures to produce a consistent drawing standard with other Wellington Water Consultancy Panel detail design drawings.

Note: Although this document makes multiple references to AutoCAD, it does not mean AutoCAD must be used to produce drawings for Wellington Water. General references and requirements have been included where possible.

1.4 Abbreviations & Acronyms

Table 1 details common abbreviations and acronyms included throughout this document.

Table 1: Abbreviations & Acronyms

Acronym / Abbreviation	Definition
CAD	Computer Aided Design
CTB	Plot Style Tables
DWG	AutoCAD Drawing File
ISA	International Society of Automation
ISO	International Organization for Standardization
NTS	Not to Scale
NZTM2000	New Zealand Transverse Mercator 2000
NZVD2016	New Zealand Vertical Datum 2016
PDF	Portable Document Format
PFD	Process Flow Diagram
PID, P&ID	Piping (Process) and Instrumentation Diagram
R.Spec	Regional Specification for Water Services
RABS	Regional As-Built Specification for Water Services
RSWS	Regional Standard for Water Services
WWL	Wellington Water Limited

1.5 Coordinates and Datum

The following coordinate system and datum shall be used for all Project drawings:

1) Design drawings can be produced using any coordinate system.
2) As-built drawings must be produced using the New Zealand Transverse Mercator 2000 (NZTM2000) coordinate system.
3) Datum must be supplied in New Zealand Vertical Datum 2016 (NZVD2016).

1.6 Hand Sketches

Once construction is underway, the site design team may be required to create hand sketches. Once verified and complete, a hard copy is to be filed and a PDF is to be created for issue to Wellington Water.

2. Drawing Set-up

Drawings produced and issued for the construction, or maintenance of water service infrastructure assets within Wellington Water's jurisdiction are to follow international standards and best practices.

2.1 Drawing Template

If using AutoCAD, you must use the supplied Wellington Water standard drawing template to meet the requirements in section 3 below. It is expected that each company will insert their own company logo and details into the template supplied.

Other Standard drawing support files for the print set ups, drawing list spreadsheet and print files can also be found in the supplied template.

The panel company lead draughtsperson shall ensure Wellington Water project template files are maintained in a specific location that all draughters can access within their organisation. Please refer to this document for the latest version of the templates.

2.2 Drawing Issue Format

1) Each drawing shall have a unique drawing number. This also applies to CAD files that contain multiple layout tabs for multiple drawings (as often used for General Arrangements and Longitudinal Sections).
2) When multiple layout tabs / multiple drawings are used, the CAD file name should reflect the range of drawings (e.g. WWL-100_110.dwg contains drawings WWL-100 through WWL-110).
3) The drawing titles 3rd line should indicate if a drawing is part of a set (e.g. sheet 1, sheet 2 etc).

3. Draughting Standards

3.1 Sheet Sizes

1) Within the CAD environment, the original sheet size for all drawings is A1 (841 x 594mm).
2) Drawings may to be reduced to A3 size for record and issue, unless specifically requested.

3.2 Drawing Scales

The scale for a drawing shall permit easy and clear interpretation of the information depicted.

Scales for both A1 and A3 (reduced) prints shall be included on the drawing. A dynamic scale bar with common scales is provided in the template (*.dwt) file referenced in section 2.1.

3.2.1 Indication of Scales

1) Where all scales on a single drawing are the same, indicate the scale used for A1 in the title block and indicate half of the scale used for A3 (e.g. 1:250 (A1) 1:500 (A3)).
2) If scales differ on a single drawing, put “AS SHOWN” for A1 in the title block and “1/2 SHOWN” for A3.
3) Where it is necessary to have a detail not drawn to scale, then in place of the ratio scale the title shall read N.T.S (meaning not to scale).
4) In all instances place the scale in the Section or Detail title.

3.2.2 Exaggerated Scales

1) Where different scales are used for horizontal and vertical dimensions, such as in long sections, then each scale shall be shown with a prefix of either HORIZ or VERT.
2) The exaggerated scale shall clearly show grades, high and low points, existing features and services, proposed pipeline and equipment etc.
3) An exaggerated dynamic scale bar with common scales is provided in the template referenced in Section 2.1.
4) The long section table shall follow the format shown in the sample included in Appendix 2.F Long Section Example.

3.3 Layer Naming

Each layer shall be given a descriptive name such that another person may easily interpret it (e.g., a road kerb is to be called “Kerb”).

3.4 Line Thickness and Spacing

The thickness of a line shall be such that when the drawing is reduced to A3 or reproduced, the lines are still clearly legible.

3.5 Line Type & Colour

These are to be set by layer as appropriate. The standard line types and colours are provided in the legend of the title block template file in AutoCAD (*.dwt) and as presented in Table 2.

Table 2: Line Types & Colours

Type	AutoCAD Colour	RGB code
Potable / Water supply	160 (blue)	0, 63, 255
Wastewater	10 (red)	255, 0, 0
Stormwater	94 (green)	0, 129, 0
Gas	N/A (Olive)	143, 143, 0
Communications	200 (Purple)	192, 0, 255
Power	30 (Orange)	255, 127, 0
Kerb lines	11 (Pink)	255, 127, 127
Property boundaries	0 (Black)	0, 0, 0

3.6 Plot Styles

Two plot style table files (.ctb) shall be used depending on the plot size as shown in Table 3:

Table 3: Plot Styles

Plot Style Name	Plot Size
WW_A1.ctb	A0 & A1
WW_A1-A3.ctb	A3 & A4

3.7 Pen Assignments

Pen weights are to be assigned by layer.

3.8 Dimensioning

Dimensions and lettering shall read from the bottom or right-hand side of the drawing sheet.

3.8.1 Dimension Style

The dimension settings are in the dimension style called “STANDARD” and is the only dimension style that is to be used. It is loaded in the drawing templates (*.dwt). This maintains uniformity across all drawn documents.

3.8.2 Angular Dimensions

Angular dimensions shall be expressed in decimal degrees.

3.9 Notation

Each necessary note to convey the designer’s intentions of the product shall be specified. No more notes than those necessary for complete definition shall be given. The recommended minimum height of characters on drawings are indicated in Table 4.

Table 4: Notation Size

Character use	Character height
Hold labels, important text	7mm
Title designations, title descriptions	5mm
Subtitles, headings, view & section/detail designations (cross reference sheet number)	3.5mm
General notes, typical text	3mm
View & section/detail reference (cross reference sheet number)	2.5mm

3.9.1 Text Styles

There are currently three text styles loaded into standard template drawings as shown in Table 5:

Table 5: Text Styles

Text style	Font name	Width factor	For use as
Arial Black	Arial Black	1	Street names and watercourses
STANDARD	Arial Narrow	1	All other text
ISO	Arial Narrow	1	All other text
NB .SHX font types must not be used – Notation including asset numbers created with .SHX fonts cannot be searched for once files are converted to PDF.			

3.9.2 Thickness of Character Lines

The thickness of characters shall be as shown in Table 6:

Table 6: Character Lines

Text Height	AutoCAD Colour	RGB code
3	2 (Yellow)	255, 255, 0
3.5	2 (Yellow)	255, 255, 0
5	3 (Green)	0, 255, 0
7	4 (Cyan)	0, 255, 255
2.5	7 (White)	255, 255, 255

3.9.3 Notes

1) Text shall be uppercase, top and left justified as a general preference.
2) Leaders and text justification shall be consistent throughout the project.
3) A leader shall be used to point to the feature concerning that note.

Where information needs to be noted concerning the entire drawing, then general notes shall be added (they should be clearly numbered).

Where information needs to be noted concerning the entire series of drawings, then a sheet containing general notes shall be added to the beginning of the series (note, series refers to a group of sequentially numbered sheets in a single sub-discipline).

3.9.4 Position of Notations

Within a set of drawings, the location of the items below is to be consistent. The recommended position of notations shall be as shown in Table 7.

Table 7: Standard Notation Position

Notation Type	Position
North Point	Top right
Key Plan	Top left
General Notes & Legend	Right
Status Stamp	Bottom right

3.10 Drawing Presentation

1) Drawings should show the amount of detail necessary for the purpose.
2) All plans shall preferably be orientated south towards the left and north towards the right.
3) All drawings shall be drawn with the same orientation.
4) Sections and elevations should be chosen to show the most appropriate amount of detail.
5) All plans, sections and details must be clearly and uniquely identified.
6) Duplication of information on a set of drawings should be avoided as this can lead to ambiguities should changes occur.

3.10.1 Cross Referencing

When referencing a detail on another drawing with a detail call-out, use the drawing number only.

3.10.2 Titles

Where sections or details do not appear on the same sheet as the section markers or detail callout, then a reference shall be added by inserting the relevant drawing number in the bottom half of the title. Otherwise use a hyphen for same sheet referencing.

1) The title should give a brief description of the detail. A scale note shall be shown under the title.
2) Titles should be laid out in an orderly flowing manner, so the reader can easily find information.

Note: Titles on plans do not require a reference ball unless they are a partial plan.

3.10.3 Sections and Details

Section and detail symbol blocks are embedded in the title block template for ease of use. Numbers or letters shall be used as the section and detail designations to your company's preference, and this must be consistent throughout the set.

3.11 Drawing Stamps

Each Drawing shall include a drawing stamp in the bottom right of the sheet.

The drawing template (*.dwt) files include a dynamic stamp which has typical approved stamps, and a colour stamp.

The colour stamp with the words "Original Drawing in Colour" shall be used where the drawing contains colour represented items (e.g. aerials, services). It is not required if the drawing only contains a coloured logo).

Two further stamps are supplied with the template (*.dwt) files referenced in section 2.1:

1) ‘Under Revision’ watermark which should be:
   a) **Off** for formal issues (generally out of office),
   b) **On** at all other times.
      Note: turn off and on by freezing/thawing the layer **Border-013**, do not unlock the layer.
2) Manual ‘Check Box’ Stamp – to be used for internal checking. This stamp is on same layer as above, and therefore is off for formal issues.

4. Drawing Sets

The completed drawing set for a project shall include, in order, the following:

Cover sheet including Project Title, Location Plan, Transmittal (Appendix 2. A)

1) The transmittal is a spreadsheet (can be linked), that includes a complete listing of the project documents, issue, size and date, recipients and reason for issue. It is provided in the AutoCAD (*.dwt) coversheet template file.
2) The only reason to not use the transmittal on the coversheet would be for projects that contain a very large number of documents. In this instance the transmittal is to be on subsequent drawing sheets.

Standard Notes, Abbreviations and Legends sheet(s) (Appendix 2. E)

1) Examples of these are provided for use and include various special notes for existing services etc.
2) These notes sheets will be kept as uniform as possible with addition of project specific notes as required.

Alignment plans / longitudinal Sections sheet(s) (Appendix 2. F)

1) The use of faded aerials as background is accepted.
2) Longitudinal sections shall follow the format as indicated in the example included in the Appendix of this Manual.
3) Project design details (as required)
4) Sets may include separate sections as required for (but not limited to) civil, structural, electrical, mechanical.
5) Drawing number conventions to follow individual company standards.

5. Printing and Issuing Drawings

5.1 Printing

5.1.1 Generic Requirements

- The PDF name shall match the DWG name (e.g. xyz.dwg and xyz.pdf). It is acceptable to add the revision number (e.g. xyz Rev1.pdf).

5.1.2 AutoCAD Guidance

1) Plot to PDF using 'DWG to PDF' within the AutoCAD plotting environment **without layers** and **to scale**.
2) Hardcopy prints are made from those PDF's. Do not use 'print to fit'.
3) Plot using views in Paper space. These views are predefined in the Template files.
4) Pen weights / colour dependent Plot Style Tables (CTB) files are included in the setup and should be accessible by AutoCAD to provide consistent plot outputs (refer section 3.6 and 3.7 of this Manual).

5.2 Signatures

Before any drawing is issued, the correct approval signatures must be present as per company procedures.

5.3 Revisions

Each drawing when issued must have a new revision letter / number and revision and/or hold clouds as required. Issue types include:

1) Preliminary issues, for information: A, B, C etc.
2) For Tender: 0 (zero), 0A, 0B etc.
3) For Building Consent, For Construction 1, 2, 3 etc.
4) Red-lined As Built (*temporary only)*: RAB
5) As Built: AB

5.4 Transmittal Notices

A document transmittal shall accompany all external issued drawings (the first drawing sheet in a project set shall include this transmittal). Refer to the template referenced in section 2.1, and the example shown in the Appendix of this Manual. It is the responsibility of the supplier to maintain this prior to issuing.

Appendix 1: Process Diagram Specific Standards

This section includes specific drawing requirements for common process drawings. All diagrams developed within or for Wellington Water are to follow internationally recognised standards and best practice. In the process industry these standards include:

1. **ISA 5.1 – Instrumentation Symbols and Identification**
2. **ISO 15519 – Specification for Diagrams for Process Industry**
3. **ISO 10628 – Diagrams for the Chemical and Petrochemical Industry**

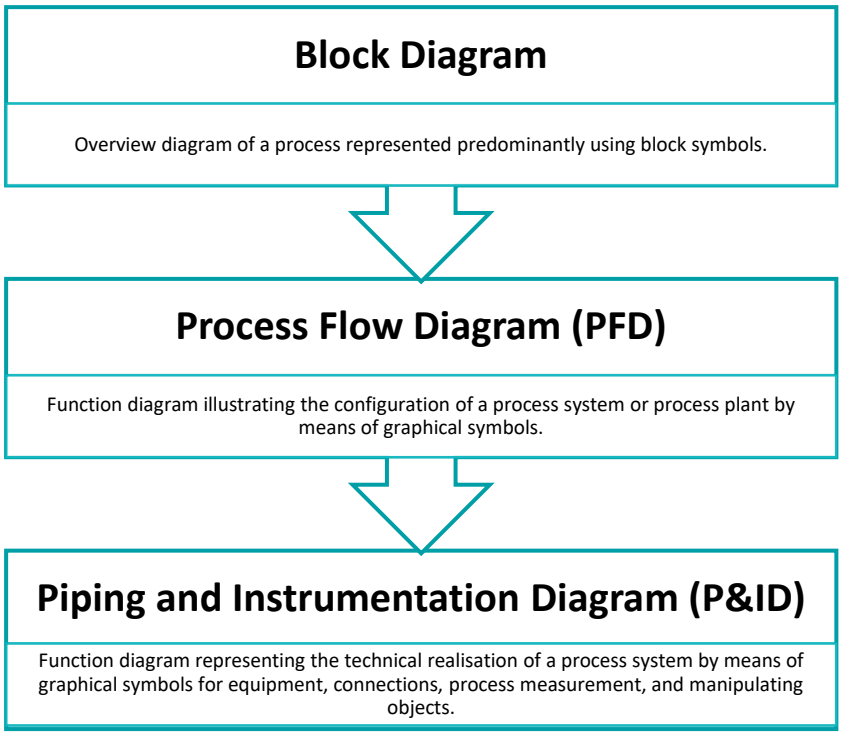
The additional guidance and requirements detailed within this Appendix take precedence over any conflicting wording or requirements within the main body of this manual when applied to process drawings.

General

Schematic type drawings, including both overview and functional drawings within process and electrical environments may be reduced to A3, where print is easily legible for ease of plant maintenance and operations.

Process Diagram Relationship

The relationship between key process diagrams is expressed below.



Examples

Examples of each of the diagrams may be found in ISO 10628-1:2014 Annex A.

A. Block Diagrams

Block diagrams represent the overall relationships between processes. In the context of a treatment plant, one block diagram can be used to illustrate the entire function of single treatment plant.

The block diagram can be used to provide a high-level overview of the entire system, showing the major components and their interconnections. It serves as a simplified representation of the overall process flow, without delving into the intricate details typically found in Process Flow Diagrams (PFDs) or Piping and Instrumentation Diagrams (P&IDs).

Block diagrams developed by or for Wellington Water should follow recognised industry standards:

1. **ISO 15519 – Specification for Diagrams for Process Industry**

   Part 1: General rules

   Part 2: Measurement and control

Graphical Symbols

Block diagrams adopt the use of blocks (rectangles) to represent key functions within a complex process. Each block should relate to a single process flow diagram. For example, within a water treatment plant, typical blocks could include:

1) Intake
2) Filtration
3) Chlorination
4) Lime
5) Coagulation
6) Mixing

Type, Depiction & Layout

Overview diagrams represent a system with a low degree of detail, using single lines to connect processes.

1) The direction of the main flow should be from left to right or from top to bottom.
2) The diagram presents the process and relationships, independent of location.

Blocks within the diagrams may include key performance characteristics or parameters important for the correct operation of the overall system. These could include (with possible units):

1) Flow Rate (m^3/s, MLD)
2) Temperature (°C)
3) Turbidity (NTU)
4) pH
5) Chlorine (mg/L)
6) Fluoride (mg/L)

B. Process Flow Diagrams (PFD)

Process flow diagrams (PFD) provide an overview of an entire process, showing the relationships between major equipment and process streams. Process flow diagrams illustrate the overall process flow including key performance parameters.

PFDs are less detailed in nature when compared to a Piping and Instrumentation Diagram, where one PFD may relate to one or more Piping and Instrumentation Diagram. A single PFD should illustrate the function of an entire process which contributes toward the overall plant block diagram.

Wellington Water has adopted the use of international recognised standards to support consistent symbology and depiction across each of our facilities. These standards include, in order of precedence:

1. **ISO 15519 - Specification for Diagrams for Process Industry**
2. **ISO 10628 - Diagrams for the Chemical and Petrochemical Industry**

Level of Detail: Specify the expected level of detail, such as major equipment, process streams, and key operating parameters (e.g., flow rates, temperatures, pressures).

Graphical Symbols

Process flow diagrams adopt the use of symbols within ISO 10628, included within the Wellington Water Process Symbol Template. Symbols should be appropriately scaled based on the complexity of the diagram, where approximately ten large, annotated symbols comprise the main process function.

The key distinction in the use of symbols between a PFD and a piping and instrumentation diagram is the level of detail and number of symbols used. Only major equipment of significance to the process, should be depicted. Typically, this includes:

1) Tanks, clarifiers, aerators, reaction.
2) Pumps, process, and dosing.
3) Major actuated valves.
4) Major filters and screens.

Type, Depiction & Layout

PFDs should all be represented as Function Diagrams with Functional Layout (as per ISO 15519-1:2010 Section 13 & 14) unless express consent is provided by Wellington Water. This means:

1) The direction of the main flow should be from left to right or from top to bottom.
2) The *vertical view* principle shall be used (i.e., equipment is shown side-on, not top-down).
3) The diagram presents key equipment and main flow paths only, omitting superfluous detail.

Key parameters or identifiers relating to the process equipment may also be annotated. For example:

1) Asset labels.
2) Tank volumes, levels.
3) Pump flow, dose rates.
4) Temperatures, pressures.
5) Chemicals, materials, and reactions.
6) Mass, energy balance figures.

C. Piping and Instrumentation Diagrams (P&ID, PID)

Piping and Instrumentation Diagrams (P&ID) serve a critical role in the operation and maintenance of facilities, including treatment plants, pump station and reservoir sites. These requirements align Wellington Water with internationally recognised standards, stated in order of precedence:

1. ISA 5.1 - Instrumentation Symbols and Identification

2. ISO 15519 - Specification for Diagrams for Process Industry

3. ISO 10628 - Diagrams for the Chemical and Petrochemical Industry

It is expected that suppliers of information to Wellington Water have these standards and refer to them in lieu of specific wording included in this Draughting Manual. However, the key elements are prescribed below.

Graphical Symbols

The Wellington Water Process Symbol Template includes the standard symbols and line types to be used for P&IDs. This template is a concise combination of ISA 5.1 and ISO 10628 using symbols typically applied in the water sector. Not all symbols and styles from both ISA 5.1 and ISO 10628 are included for ease of use.

In instances where a symbol is excluded from the template:

1) Consult the underpinning standards, in the order of precedence noted, for the correct symbol.
2) If neither ISA 5.1 nor ISO 10628 appropriately depict the equipment, a symbol should be constructed by combining other symbols within the standards.

Both instances should be undertaken in consultation with the Wellington Water.

Type, Depiction & Layout

P&IDs should be represented as Function Diagrams with Functional Layout (as per ISO 15519-1:2010 Section 13 & 14) unless express consent is provided by Wellington Water. This means:

1) The direction of the main flow should be from left to right or from top to bottom.
2) The *vertical view* principle shall be used (i.e., equipment is shown side-on, not top-down).
3) The diagram shall present the objects and their interconnections, independent of physical implementation.

A well-laid out, fully developed P&ID should have a major equipment summary table at the top of the sheet indicating tag number, equipment name and capacity (e.g., volume for tanks and vessels, flow rate and power for rotating equipment).

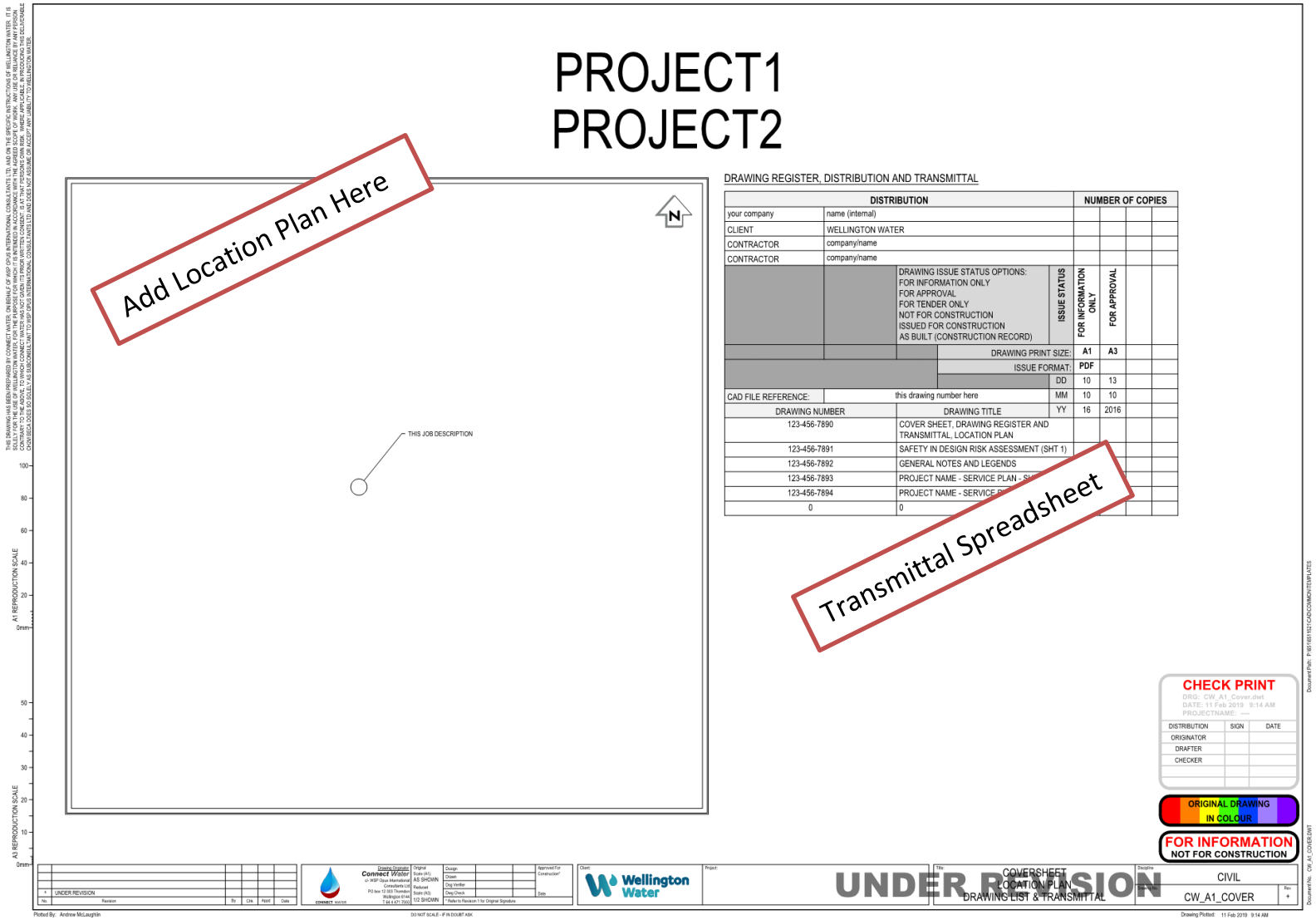
Tanks and vessels should be drawn in the central band of the drawing area, rotating equipment (pumps/fans/compressors) in the lower band, and controls in the top band.

A P&ID should be laid out in a manner that is clear and aids the understanding of the process, flow and control. It should not be overcrowded. Two or more well laid-out sheet would be preferred to a single congested drawing.

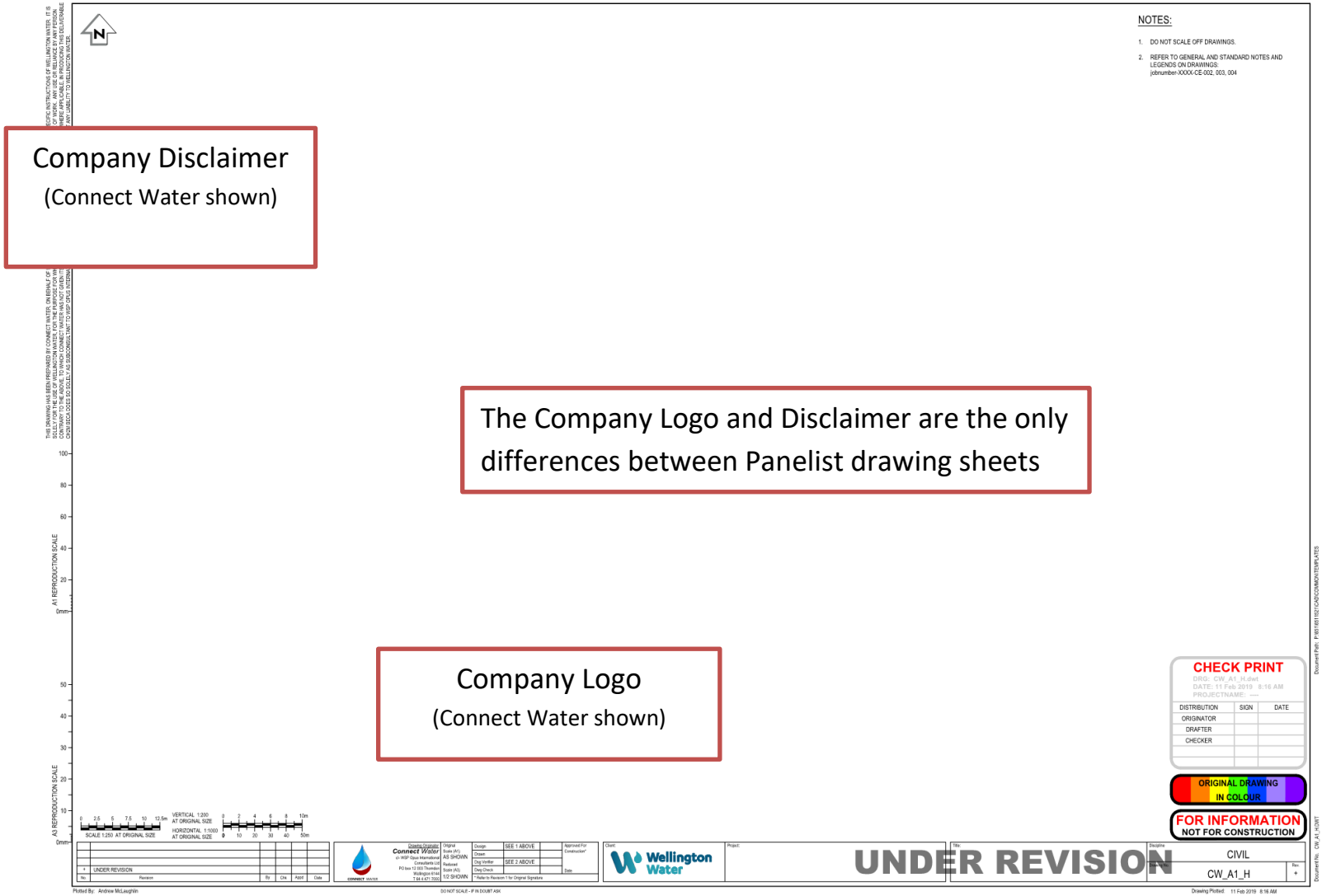
Appendix 2: Standard Drawing Examples

The following pages provide the expected drawing sheet details to be included on all drawings submitted to Wellington Water.

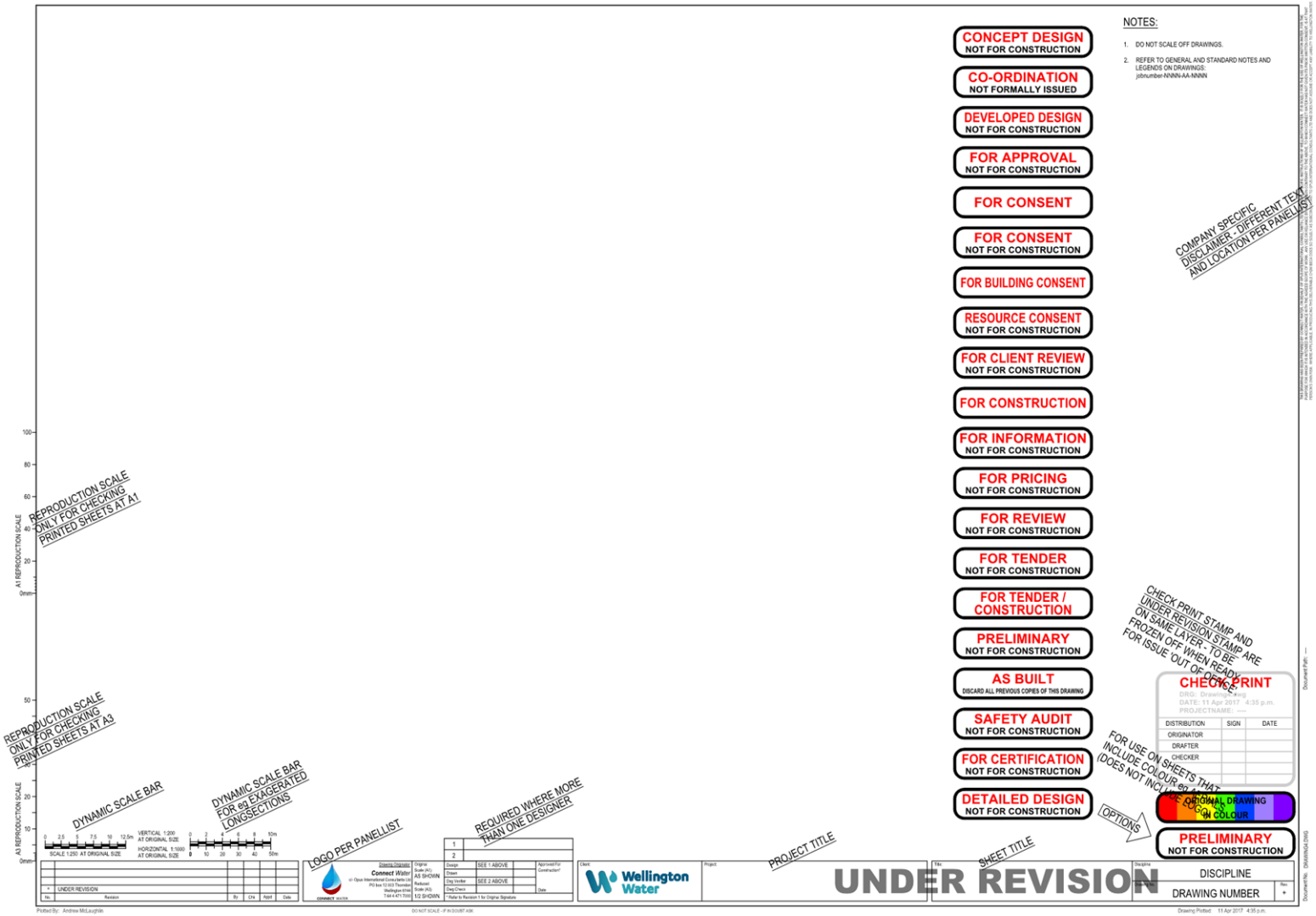
A. Coversheet Template Example



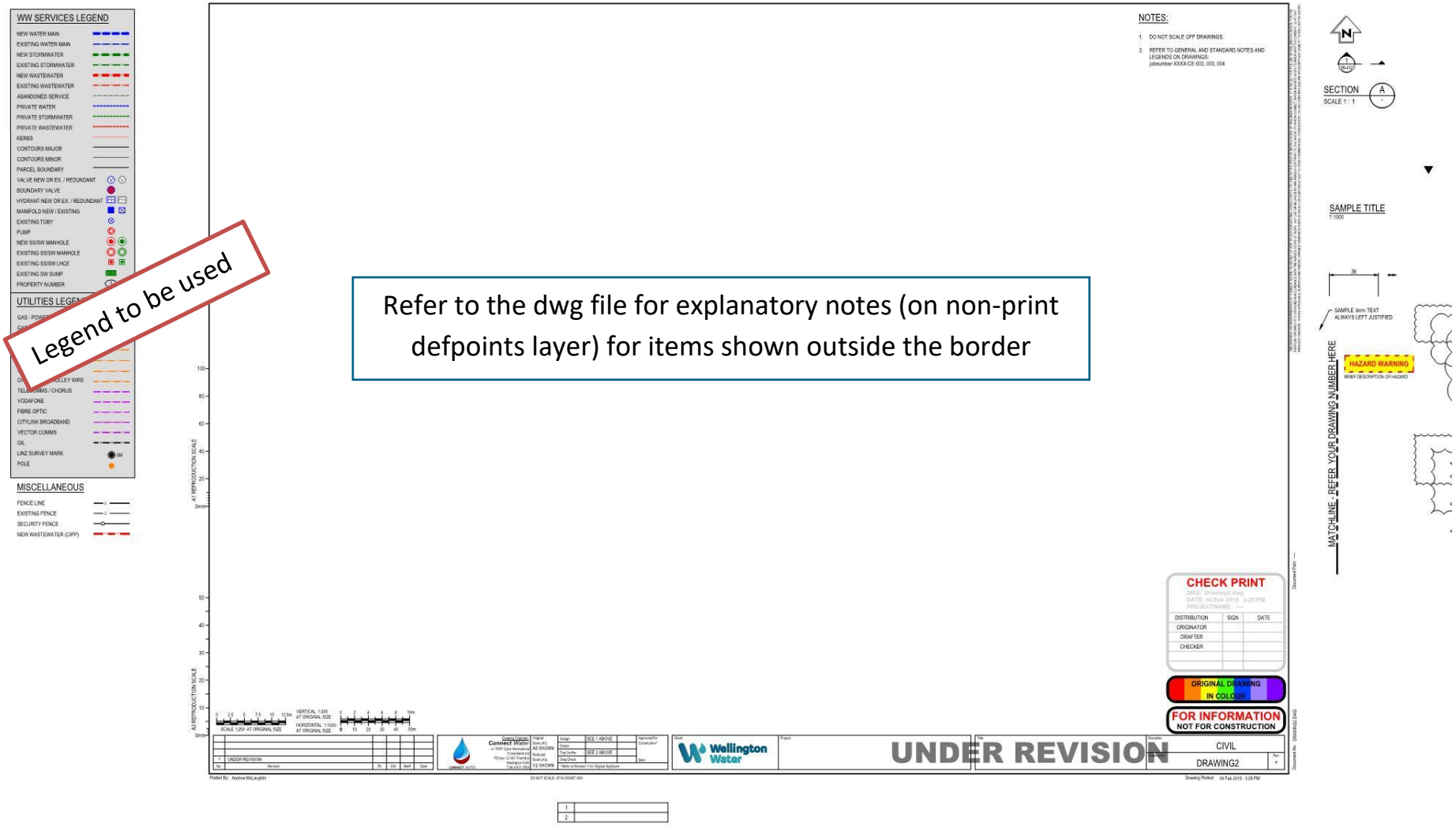
B. Drawing Border Template Example



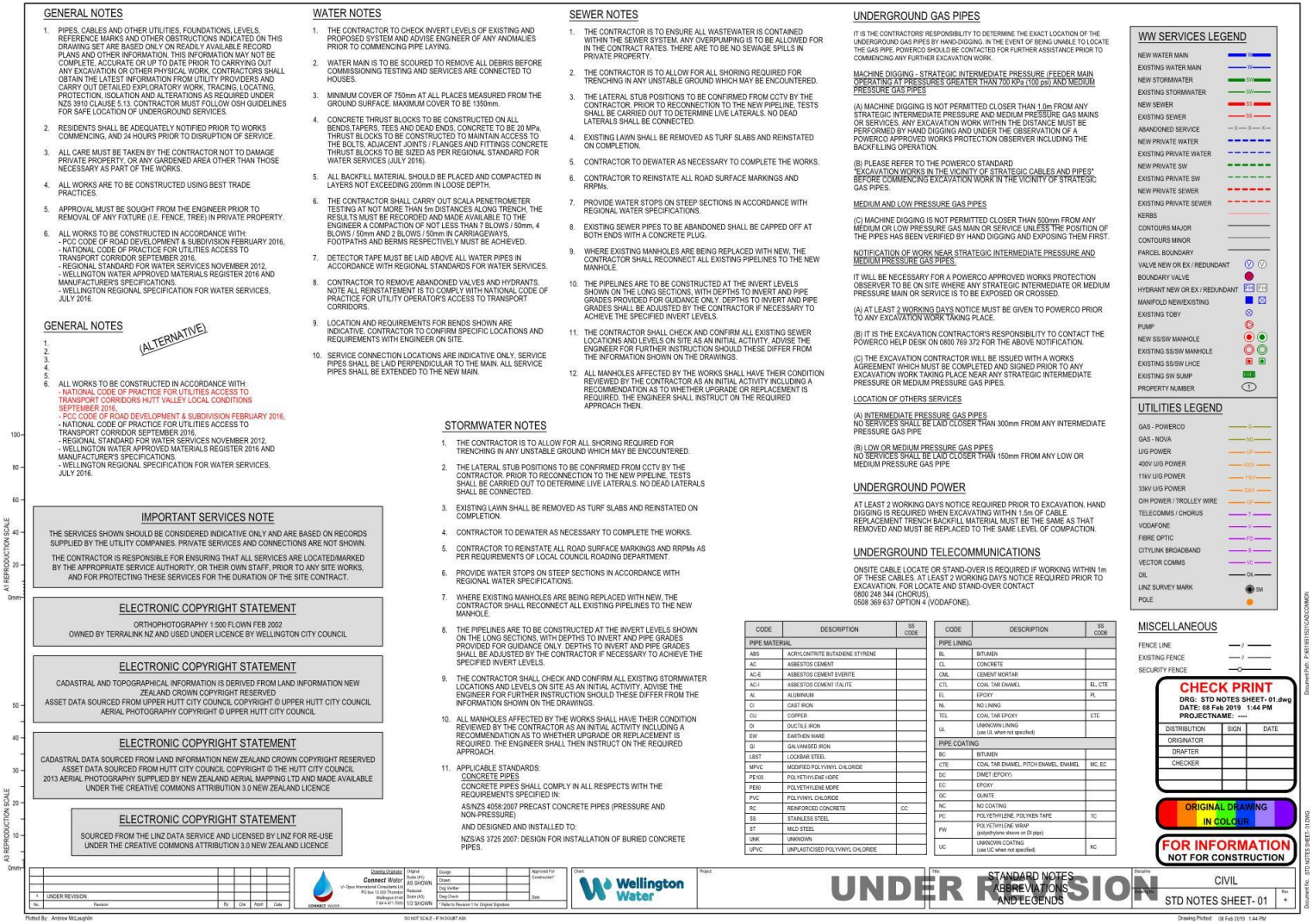
C. Drawing Border Explanation



D. Drawing Border Extras



E. Example Standard Notes Sheet



GENERAL NOTES

1. PIPES, CABLES AND OTHER UTILITIES, FOUNDATIONS, LEVELS, REFERENCE MARKS AND OTHER OBSTRUCTIONS INDICATED ON THIS DRAWING SET ARE BASED ONLY ON READILY AVAILABLE RECORD PLANS AND OTHER INFORMATION. THIS INFORMATION MAY NOT BE COMPLETE, ACCURATE OR UP TO DATE PRIOR TO CARRYING OUT ANY EXCAVATION OR OTHER PHYSICAL WORK. CONTRACTORS SHALL OBTAIN THE LATEST INFORMATION FROM UTILITY PROVIDERS AND CARRY OUT DETAILED EXPLORATORY WORK, TRACING, LOCATING, PROTECTION, ISOLATION AND ALTERATIONS AS REQUIRED UNDER NZS 3910 CLAUSE 5.13. CONTRACTOR MUST FOLLOW OSH GUIDELINES FOR SAFE LOCATION OF UNDERGROUND SERVICES.
2. RESIDENTS SHALL BE ADEQUATELY NOTIFIED PRIOR TO WORKS COMMENCING, AND 24 HOURS PRIOR TO DISRUPTION OF SERVICE.
3. ALL CARE MUST BE TAKEN BY THE CONTRACTOR NOT TO DAMAGE PRIVATE PROPERTY, OR ANY GARDENED AREA OTHER THAN THOSE NECESSARY AS PART OF THE WORKS.
4. ALL WORKS ARE TO BE CONSTRUCTED USING BEST TRADE PRACTICES.
5. APPROVAL MUST BE SOUGHT FROM THE ENGINEER PRIOR TO REMOVAL OF ANY FIXTURE (I.E. FENCE, TREE) IN PRIVATE PROPERTY.
6. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH:
   - PCC CODE OF ROAD DEVELOPMENT & SUBDIVISION FEBRUARY 2016,
   - NATIONAL CODE OF PRACTICE FOR UTILITIES ACCESS TO TRANSPORT CORRIDOR SEPTEMBER 2016,
   - REGIONAL STANDARD FOR WATER SERVICES NOVEMBER 2012,
   - WELLINGTON WATER APPROVED MATERIALS REGISTER 2016 AND MANUFACTURER'S SPECIFICATIONS.
   - WELLINGTON REGIONAL SPECIFICATION FOR WATER SERVICES, JULY 2016.

GENERAL NOTES (ALTERNATIVE)

1.
2.
3.
4.
5.
6. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH:
   - NATIONAL CODE OF PRACTICE FOR UTILITIES ACCESS TO TRANSPORT CORRIDORS HUTT VALLEY LOCAL CONDITIONS SEPTEMBER 2016,
   - PCC CODE OF ROAD DEVELOPMENT & SUBDIVISION FEBRUARY 2016,
   - NATIONAL CODE OF PRACTICE FOR UTILITIES ACCESS TO TRANSPORT CORRIDOR SEPTEMBER 2016,
   - REGIONAL STANDARD FOR WATER SERVICES NOVEMBER 2012,
   - WELLINGTON WATER APPROVED MATERIALS REGISTER 2016 AND MANUFACTURER'S SPECIFICATIONS.
   - WELLINGTON REGIONAL SPECIFICATION FOR WATER SERVICES, JULY 2016.

IMPORTANT SERVICES NOTE

THE SERVICES SHOWN SHOULD BE CONSIDERED INDICATIVE ONLY AND ARE BASED ON RECORDS SUPPLIED BY THE UTILITY COMPANIES. PRIVATE SERVICES AND CONNECTIONS ARE NOT SHOWN.

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL SERVICES ARE LOCATED/MARKED BY THE APPROPRIATE SERVICE AUTHORITY, OR THEIR OWN STAFF, PRIOR TO ANY SITE WORKS, AND FOR PROTECTING THESE SERVICES FOR THE DURATION OF THE SITE CONTRACT.

ELECTRONIC COPYRIGHT STATEMENT

ORTHOPHOTOGRAPHY 1:500 FLOWN FEB 2002
OWNED BY TERRALINK NZ AND USED UNDER LICENCE BY WELLINGTON CITY COUNCIL

ELECTRONIC COPYRIGHT STATEMENT

CADASTRAL AND TOPOGRAPHICAL INFORMATION IS DERIVED FROM LAND INFORMATION NEW ZEALAND CROWN COPYRIGHT RESERVED
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ELECTRONIC COPYRIGHT STATEMENT

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WATER NOTES

1. THE CONTRACTOR TO CHECK INVERT LEVELS OF EXISTING AND PROPOSED SYSTEM AND ADVISE ENGINEER OF ANY ANOMALIES PRIOR TO COMMENCING PIPE LAYING.
2. WATER MAIN IS TO BE SCOURED TO REMOVE ALL DEBRIS BEFORE COMMISSIONING TESTING AND SERVICES ARE CONNECTED TO HOUSES.
3. MINIMUM COVER OF 750mm AT ALL PLACES MEASURED FROM THE GROUND SURFACE. MAXIMUM COVER TO BE 1350mm.
4. CONCRETE THRUST BLOCKS TO BE CONSTRUCTED ON ALL BENDS, TAPERS, TEES AND DEAD ENDS. CONCRETE TO BE 20 MPa. THRUST BLOCKS TO BE CONSTRUCTED TO MAINTAIN ACCESS TO THE BOLTS, ADJACENT JOINTS / FLANGES AND FITTINGS CONCRETE THRUST BLOCKS TO BE SIZED AS PER REGIONAL STANDARD FOR WATER SERVICES (JULY 2016).
5. ALL BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 200mm IN LOOSE DEPTH.
6. THE CONTRACTOR SHALL CARRY OUT SCALA PENETROMETER TESTING AT NOT MORE THAN 5m DISTANCES ALONG TRENCH. THE RESULTS MUST BE RECORDED AND MADE AVAILABLE TO THE ENGINEER A COMPACTION OF NOT LESS THAN 7 BLOWS / 50mm, 4 BLOWS / 50mm AND 2 BLOWS / 50mm IN CARRIAGEWAYS, FOOTPATHS AND BERMS RESPECTIVELY MUST BE ACHIEVED.
7. DETECTOR TAPE MUST BE LAID ABOVE ALL WATER PIPES IN ACCORDANCE WITH REGIONAL STANDARDS FOR WATER SERVICES.
8. CONTRACTOR TO REMOVE ABANDONED VALVES AND HYDRANTS. NOTE ALL REINSTATEMENT IS TO COMPLY WITH NATIONAL CODE OF PRACTICE FOR UTILITY OPERATOR'S ACCESS TO TRANSPORT CORRIDORS.
9. LOCATION AND REQUIREMENTS FOR BENDS SHOWN ARE INDICATIVE. CONTRACTOR TO CONFIRM SPECIFIC LOCATIONS AND REQUIREMENTS WITH ENGINEER ON SITE.
10. SERVICE CONNECTION LOCATIONS ARE INDICATIVE ONLY. SERVICE PIPES SHALL BE LAID PERPENDICULAR TO THE MAIN. ALL SERVICE PIPES SHALL BE EXTENDED TO THE NEW MAIN.

SEWER NOTES

1. THE CONTRACTOR IS TO ENSURE ALL WASTEWATER IS CONTAINED WITHIN THE SEWER SYSTEM. ANY OVERPUMPING IS TO BE ALLOWED FOR IN THE CONTRACT RATES. THERE ARE TO BE NO SEWAGE SPILLS IN PRIVATE PROPERTY.
2. THE CONTRACTOR IS TO ALLOW FOR ALL SHORING REQUIRED FOR TRENCHING IN ANY UNSTABLE GROUND WHICH MAY BE ENCOUNTERED.
3. THE LATERAL STUB POSITIONS TO BE CONFIRMED FROM CCTV BY THE CONTRACTOR. PRIOR TO RECONNECTION TO THE NEW PIPELINE, TESTS SHALL BE CARRIED OUT TO DETERMINE LIVE LATERALS. NO DEAD LATERALS SHALL BE CONNECTED.
4. EXISTING LAWN SHALL BE REMOVED AS TURF SLABS AND REINSTATED ON COMPLETION.
5. CONTRACTOR TO DEWATER AS NECESSARY TO COMPLETE THE WORKS.
6. CONTRACTOR TO REINSTATE ALL ROAD SURFACE MARKINGS AND RRPMs.
7. PROVIDE WATER STOPS ON STEEP SECTIONS IN ACCORDANCE WITH REGIONAL WATER SPECIFICATIONS.
8. EXISTING SEWER PIPES TO BE ABANDONED SHALL BE CAPPED OFF AT BOTH ENDS WITH A CONCRETE PLUG.
9. WHERE EXISTING MANHOLES ARE BEING REPLACED WITH NEW, THE CONTRACTOR SHALL RECONNECT ALL EXISTING PIPELINES TO THE NEW MANHOLE.
10. THE PIPELINES ARE TO BE CONSTRUCTED AT THE INVERT LEVELS SHOWN ON THE LONG SECTIONS, WITH DEPTHS TO INVERT AND PIPE GRADES PROVIDED FOR GUIDANCE ONLY. DEPTHS TO INVERT AND PIPE GRADES SHALL BE ADJUSTED BY THE CONTRACTOR IF NECESSARY TO ACHIEVE THE SPECIFIED INVERT LEVELS.
11. THE CONTRACTOR SHALL CHECK AND CONFIRM ALL EXISTING SEWER LOCATIONS AND LEVELS ON SITE AS AN INITIAL ACTIVITY, ADVISE THE ENGINEER FOR FURTHER INSTRUCTION SHOULD THESE DIFFER FROM THE INFORMATION SHOWN ON THE DRAWINGS.
12. ALL MANHOLES AFFECTED BY THE WORKS SHALL HAVE THEIR CONDITION REVIEWED BY THE CONTRACTOR AS AN INITIAL ACTIVITY INCLUDING A RECOMMENDATION AS TO WHETHER UPGRADE OR REPLACEMENT IS REQUIRED. THE ENGINEER SHALL INSTRUCT ON THE REQUIRED APPROACH THEN.

STORMWATER NOTES

1. THE CONTRACTOR IS TO ALLOW FOR ALL SHORING REQUIRED FOR TRENCHING IN ANY UNSTABLE GROUND WHICH MAY BE ENCOUNTERED.
2. THE LATERAL STUB POSITIONS TO BE CONFIRMED FROM CCTV BY THE CONTRACTOR. PRIOR TO RECONNECTION TO THE NEW PIPELINE, TESTS SHALL BE CARRIED OUT TO DETERMINE LIVE LATERALS. NO DEAD LATERALS SHALL BE CONNECTED.
3. EXISTING LAWN SHALL BE REMOVED AS TURF SLABS AND REINSTATED ON COMPLETION.
4. CONTRACTOR TO DEWATER AS NECESSARY TO COMPLETE THE WORKS.
5. CONTRACTOR TO REINSTATE ALL ROAD SURFACE MARKINGS AND RRPMs AS PER REQUIREMENTS OF LOCAL COUNCIL ROADING DEPARTMENT.
6. PROVIDE WATER STOPS ON STEEP SECTIONS IN ACCORDANCE WITH REGIONAL WATER SPECIFICATIONS.
7. WHERE EXISTING MANHOLES ARE BEING REPLACED WITH NEW, THE CONTRACTOR SHALL RECONNECT ALL EXISTING PIPELINES TO THE NEW MANHOLE.
8. THE PIPELINES ARE TO BE CONSTRUCTED AT THE INVERT LEVELS SHOWN ON THE LONG SECTIONS, WITH DEPTHS TO INVERT AND PIPE GRADES PROVIDED FOR GUIDANCE ONLY. DEPTHS TO INVERT AND PIPE GRADES SHALL BE ADJUSTED BY THE CONTRACTOR IF NECESSARY TO ACHIEVE THE SPECIFIED INVERT LEVELS.
9. THE CONTRACTOR SHALL CHECK AND CONFIRM ALL EXISTING STORMWATER LOCATIONS AND LEVELS ON SITE AS AN INITIAL ACTIVITY, ADVISE THE ENGINEER FOR FURTHER INSTRUCTION SHOULD THESE DIFFER FROM THE INFORMATION SHOWN ON THE DRAWINGS.
10. ALL MANHOLES AFFECTED BY THE WORKS SHALL HAVE THEIR CONDITION REVIEWED BY THE CONTRACTOR AS AN INITIAL ACTIVITY INCLUDING A RECOMMENDATION AS TO WHETHER UPGRADE OR REPLACEMENT IS REQUIRED. THE ENGINEER SHALL THEN INSTRUCT ON THE REQUIRED APPROACH.
11. APPLICABLE STANDARDS:
    CONCRETE PIPES
    CONCRETE PIPES SHALL COMPLY IN ALL RESPECTS WITH THE REQUIREMENTS SPECIFIED IN:
    AS/NZS 4058:2007 PRECAST CONCRETE PIPES (PRESSURE AND NON-PRESSURE)
    AND DESIGNED AND INSTALLED TO:
    NZS/AS 3725 2007: DESIGN FOR INSTALLATION OF BURIED CONCRETE PIPES.

UNDERGROUND GAS PIPES

IT IS THE CONTRACTORS' RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF THE UNDERGROUND GAS PIPES BY HAND-DIGGING. IN THE EVENT OF BEING UNABLE TO LOCATE THE GAS PIPE, POWERCO SHOULD BE CONTACTED FOR FURTHER ASSISTANCE PRIOR TO COMMENCING ANY FURTHER EXCAVATION WORK.

MACHINE DIGGING - STRATEGIC INTERMEDIATE PRESSURE (FEEDER MAIN OPERATING AT PRESSURES GREATER THAN 700 KPa (100 psi) AND MEDIUM PRESSURE GAS PIPES

(A) MACHINE DIGGING IS NOT PERMITTED CLOSER THAN 1.0m FROM ANY STRATEGIC INTERMEDIATE PRESSURE AND MEDIUM PRESSURE GAS MAINS OR SERVICES. ANY EXCAVATION WORK WITHIN THE DISTANCE MUST BE PERFORMED BY HAND DIGGING AND UNDER THE OBSERVATION OF A POWERCO APPROVED WORKS PROTECTION OBSERVER INCLUDING THE BACKFILLING OPERATION.

(B) PLEASE REFER TO THE POWERCO STANDARD "EXCAVATION WORKS IN THE VICINITY OF STRATEGIC CABLES AND PIPES" BEFORE COMMENCING EXCAVATION WORK IN THE VICINITY OF STRATEGIC GAS PIPES.

MEDIUM AND LOW PRESSURE GAS PIPES

(C) MACHINE DIGGING IS NOT PERMITTED CLOSER THAN 500mm FROM ANY MEDIUM OR LOW PRESSURE GAS MAIN OR SERVICE UNLESS THE POSITION OF THE PIPES HAS BEEN VERIFIED BY HAND DIGGING AND EXPOSING THEM FIRST.

NOTIFICATION OF WORK NEAR STRATEGIC INTERMEDIATE PRESSURE AND MEDIUM PRESSURE GAS PIPES.

IT WILL BE NECESSARY FOR A POWERCO APPROVED WORKS PROTECTION OBSERVER TO BE ON SITE WHERE ANY STRATEGIC INTERMEDIATE OR MEDIUM PRESSURE MAIN OR SERVICE IS TO BE EXPOSED OR CROSSED.

(A) AT LEAST 2 WORKING DAYS NOTICE MUST BE GIVEN TO POWERCO PRIOR TO ANY EXCAVATION WORK TAKING PLACE.

(B) IT IS THE EXCAVATION CONTRACTOR'S RESPONSIBILITY TO CONTACT THE POWERCO HELP DESK ON 0800 769 372 FOR THE ABOVE NOTIFICATION.

(C) THE EXCAVATION CONTRACTOR WILL BE ISSUED WITH A WORKS AGREEMENT WHICH MUST BE COMPLETED AND SIGNED PRIOR TO ANY EXCAVATION WORK TAKING PLACE NEAR ANY STRATEGIC INTERMEDIATE PRESSURE OR MEDIUM PRESSURE GAS PIPES.

LOCATION OF OTHERS SERVICES

(A) INTERMEDIATE PRESSURE GAS PIPES
NO SERVICES SHALL BE LAID CLOSER THAN 300mm FROM ANY INTERMEDIATE PRESSURE GAS PIPE

(B) LOW OR MEDIUM PRESSURE GAS PIPES
NO SERVICES SHALL BE LAID CLOSER THAN 150mm FROM ANY LOW OR MEDIUM PRESSURE GAS PIPE

UNDERGROUND POWER

AT LEAST 2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION, HAND DIGGING IS REQUIRED WHEN EXCAVATING WITHIN 1.5m OF CABLE. REPLACEMENT TRENCH BACKFILL MATERIAL MUST BE THE SAME AS THAT REMOVED AND MUST BE REPLACED TO THE SAME LEVEL OF COMPACTION.

UNDERGROUND TELECOMMUNICATIONS

ONSITE CABLE LOCATE OR STAND-OVER IS REQUIRED IF WORKING WITHIN 1m OF THESE CABLES. AT LEAST 2 WORKING DAYS NOTICE REQUIRED PRIOR TO EXCAVATION. FOR LOCATE AND STAND-OVER CONTACT
0800 248 344 (CHORUS),
0508 369 637 OPTION 4 (VODAFONE).

CODE	DESCRIPTION	SS CODE
PIPE MATERIAL		
ABS	ACRYLONITRITE BUTADIENE STYRENE	
AC	ASBESTOS CEMENT	
AC-E	ASBESTOS CEMENT EVERITE	
AC-I	ASBESTOS CEMENT ITALITE	
AL	ALUMINUM	
CI	CAST IRON	
CU	COPPER	
DI	DUCTILE IRON	
EW	EARTHEN WARE	
GI	GALVANISED IRON	
LBST	LOCKBAR STEEL	
MPVC	MODIFIED POLYVINYL CHLORIDE	
PE100	POLYETHYLENE HDPE	
PE80	POLYETHYLENE MDPE	
PVC	POLYVINYL CHLORIDE	
RC	REINFORCED CONCRETE	CC
SS	STAINLESS STEEL	
ST	MILD STEEL	
UNK	UNKNOWN	
UPVC	UNPLASTICISED POLYVINYL CHLORIDE	

CODE	DESCRIPTION	SS CODE
PIPE LINING		
BL	BITUMEN	
CL	CONCRETE	
CML	CEMENT MORTAR	
CTL	COAL TAR ENAMEL	EL, CTE
EL	EPOXY	PL
NL	NO LINING	
TEL	COAL TAR EPOXY	CTE
UL	UNKNOWN LINING (use UL when not specified)	
PIPE COATING		
BC	BITUMEN	
CTE	COAL TAR ENAMEL, PITCH ENAMEL, ENAMEL	MC, EC
DC	DIMET (EPOXY)	
EC	EPOXY	
GC	GUNITE	
NC	NO COATING	
PC	POLYETHYLENE, POLYKEN TAPE	TC
PW	POLYETHYLENE WRAP (polyethylene sleeve on DI pipe)	
UC	UNKNOWN COATING (use UC when not specified)	KC

WW SERVICES LEGEND

NEW WATER MAIN
EXISTING WATER MAIN
NEW STORMWATER
EXISTING STORMWATER
NEW SEWER
EXISTING SEWER
ABANDONED SERVICE
NEW PRIVATE WATER
EXISTING PRIVATE WATER
NEW PRIVATE SW
EXISTING PRIVATE SW
NEW PRIVATE SEWER
EXISTING PRIVATE SEWER
KERBS
CONTOURS MAJOR
CONTOURS MINOR
PARCEL BOUNDARY
VALVE NEW OR EX / REDUNDANT
BOUNDARY VALVE
HYDRANT NEW OR EX / REDUNDANT
MANIFOLD NEW/EXISTING
EXISTING TOBY
PUMP
NEW SS/SW MANHOLE
EXISTING SS/SW MANHOLE
EXISTING SS/SW LHCE
EXISTING SW SUMP
PROPERTY NUMBER

UTILITIES LEGEND

GAS - POWERCO
GAS - NOVA
U/G POWER
400V U/G POWER
11kV U/G POWER
33kV U/G POWER
O/H POWER / TROLLEY WIRE
TELECOMMS / CHORUS
VODAFONE
FIBRE OPTIC
CITYLINK BROADBAND
VECTOR COMMS
OIL
LINZ SURVEY MARK
POLE

MISCELLANEOUS

FENCE LINE
EXISTING FENCE
SECURITY FENCE

CHECK PRINT
DRG: STD NOTES SHEET- 01.dwg
DATE: 08 Feb 2019 1:44 PM
PROJECTNAME: ----

DISTRIBUTION	SIGN	DATE
ORIGINATOR		
DRAFTER		
CHECKER		

ORIGINAL DRAWING IN COLOUR

FOR INFORMATION NOT FOR CONSTRUCTION

UNDER REVISION

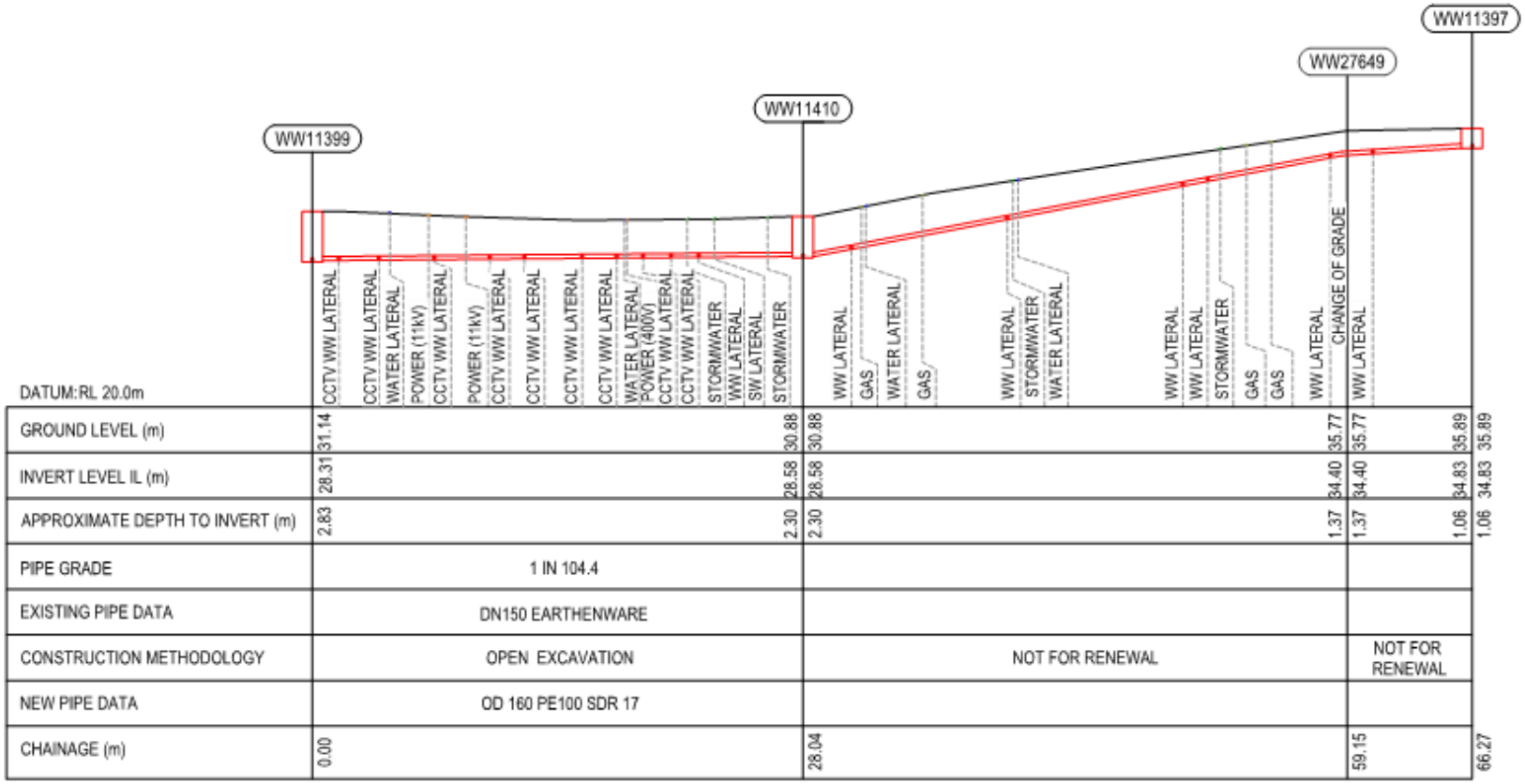
Wellington Water

STANDARD NOTES, ABBREVIATIONS AND LEGENDS

CIVIL

STD NOTES SHEET- 01

F. Long Section Example



LONGITUDINAL SECTION
1:250

The long section should use a 'top down' convention as shown above, where items are listed from the highest level to the lowest level by row, followed by information rows. When using 3D software, templates need to reflect this format.