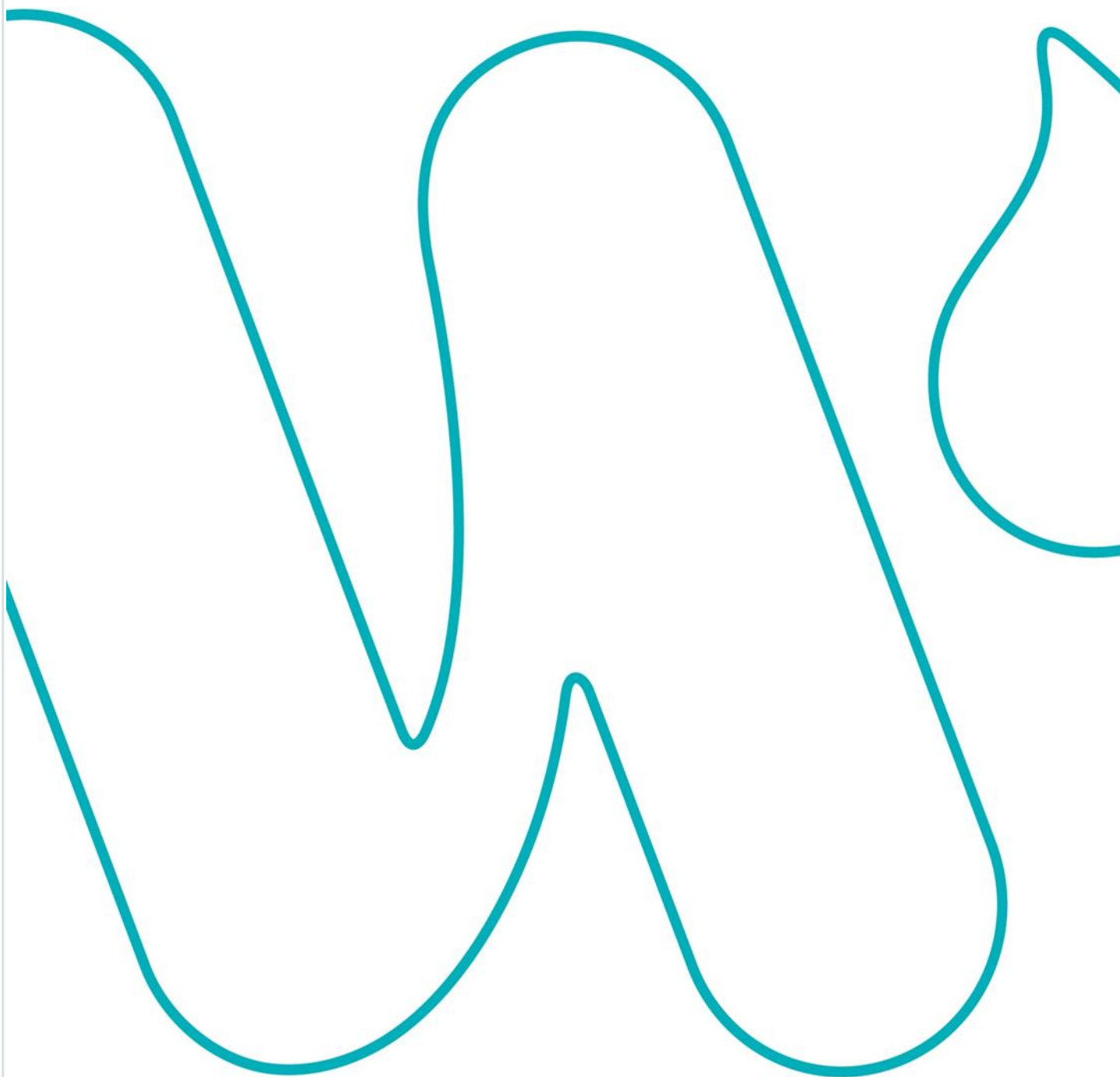


# Regional As-Built Specification for Water Services

October 2022 Version 1.1



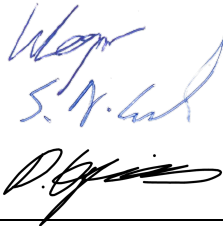


# Document Control

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

| Revision No | Prepared By                            | Description  | Date                   |
|-------------|--|--|------------------------|
| 0 to 0.6    | Various                                | Interim Regional Design and As-Built Specification V5 V6 by Capacity Infrastructure Services Ltd Version (0 to 6 inclusive).   | Oct 2013<br>April 2014 |
| 1.0         | Dylan Hopkins, Wade Gosper, Steve Luck | Full revision using existing implemented and draft as-built specification documents. It was also revised to align with the Regional Standard for Water Services and Regional Specification for Water Services. | November 2021          |
| 1.1         | Wade Gosper                            | Section 2.3: <ul style="list-style-type: none"> <li>Updated coordinate and vertical datum requirements</li> <li>Updated to provide options for non-CAD based deliverables from Contractors</li> </ul>          | October 2022           |

## Document Acceptance

| Description        | Name   | Date         | Signature   |
|--------------------|--|--------------|---|
| <b>Prepared by</b> | Wade Gosper – Senior Analyst Data Quality (Asset Data Management)<br>Steve Luck – Analyst Data Quality (Asset Data Management)<br>Dylan Hopkins (Team Lead - Data, Information and Analysis) | October 2022 |   |
| <b>Reviewer</b>    | Helen Rayner (Chief Data and Technology Officer)   | October 2022 |   |
| <b>Approver</b>    | Julie Alexander (General Manager - Network Strategy and Planning)  | October 2022 |  |

## Acknowledgements

Wellington Water would like to acknowledge Mike Travis (former Wellington Water Data Steward) and Steve Robson (former Wellington Water Data Project Manager) for their hard work and contributions to the development of this document.

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# 1 Introduction

The purpose of this specification is to provide technical guidance and consistency with engineering drawing production, and delivery of drawing, as-built data, and associated information to Wellington Water Limited (“Wellington Water”). The specification relates to the design, construction, operation and maintenance of stormwater, wastewater, and water supply<sup>1</sup> infrastructure (referred to as the “three waters”) within the boundaries of its participating councils.

This document supports and complements the Wellington Water Regional Standard for Water Services (RSWS), Regional Specification for Water Services (RSpec), and Regional Draughting Manual for Water Services (all available at <https://www.wellingtonwater.co.nz>).

It is intended that the provisions within this document shall be applied to the information and data derived from and for, the engineering design, construction, and installation of infrastructure in new subdivisions, and the maintenance, renewal, and upgrades of existing council three water services infrastructure.

The as-built data requirements are based on a Wellington Water developed metadata standard which, in turn, is based on the New Zealand Asset Metadata Standard (NZAMS) for three waters.

## 1.1 Review of Specifications

This specification may undergo occasional amendment as policy, processes and technology evolves. The reader should ensure they are referring to the most recent version of the specifications which can be found at [www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz). Any feedback on the specifications can be emailed to [standards@wellingtonwater.co.nz](mailto:standards@wellingtonwater.co.nz), or sent through to:

Wellington Water  
Private Bag 39-804  
Wellington Mail Centre 5045  
Lower Hutt  
c/-Standards

## 1.2 Previous Versions and this Document

Currently, the as-built specifications used for capture of as-built water services construction, maintenance, and new installations is contained in an interim document dated October 2013 v3. Other revisions have been produced up to and including revision v6 dated May 2014 were never published as final, and therefore never adopted.

This revised edition of the document (v1.0) supersedes all previous versions of the as-built specification and has been developed based on the revised versions and the RSWS and RSpec documents, Council as-built specification documents, and New Zealand Contract and Infrastructure standards (NZS 3910:2013 and NZS 4404:2010).

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<sup>1</sup> Water supply is also commonly referred to as Potable Water (PW). The PW code is used throughout the data schema and code lists within the appendix.

## 1.3 Departures from this Specification

Departures from this specification shall only be made with the written permission of the Wellington Water manager or team lead appointed to look after the project in consultation with the Wellington Water Digital Products and Services (DPS) team to ensure compatibility with Wellington Water IT systems, ingestion processes and data schemas.

## 1.4 References

### 1.4.1 Document references

Other documents referenced in this document are listed in the table below:

| Document name   | Wellington Water website link |
|---|-------------------------------|
| Wellington Water – Regional Standard for Water Services   | <a href="#">Link</a>          |
| Wellington Water – Regional Specification for Water Services  | <a href="#">Link</a>          |
| Wellington Water – Regional Draughting Manual for Water Services  | <a href="#">Link</a>          |
| STANDARD CONDITIONS OF CONTRACT DOCUMENT FOR DRAINAGE & WATER WORKS (Wellington Water Ltd – Contract – NZS3910:2013 – 19052017) | <a href="#">Link</a>          |

### 1.4.2 Standards references

Standards referenced in this document are listed in the table below:

| Standard Reference                  | Title   |
|-------------------------------------|---|
| NZS 4404:2010                       | Land development and subdivision infrastructure   |
| NZS 3910:2013                       | Conditions of contract for building and civil engineering construction  |
| Volume 1: As-Constructed / As-Built | New Zealand Treasury – National Infrastructure Unit<br>New Zealand Asset Metadata Standards <ul style="list-style-type: none"> <li>• Potable Water</li> <li>• Wastewater</li> <li>• Stormwater</li> </ul> |

## 2 General As-built Specifications

The following section details the general as-built specification for drawings, while section 3 provides the detailed specifications by water type and asset type.

All produced as-built drawings (both surveyor drawn and updated for-construction versions), including any alterations, amendments, additions or connections to the three waters network, are to be produced and supplied consistently against the approved standards and criteria within this specification.

This specification does not provide guidance or requirements for the design phase of a project. Please refer to the general specification for stormwater, wastewater and water supply included within the RSWS. The relevant sections of the RSWS are:

- 4.4.1.3 Design and Construction Drawings – Stormwater.
- 5.4.1.3 Design and Construction Drawings – Wastewater.
- 6.4.1.3 Design and Construction Drawings – Water Supply.

### 2.1 Drawing types and stages

#### 2.1.1 Drawing Types

- **Services Plan / Plot Plan** – A detailed layout drawing of an area that shows the extent of work and the above and underground services. Used for the design, construction, and future location reference of service assets. This drawing will be used to produce the data capture details for ingestion into Wellington Water’s asset management systems.
- **Isometric Drawing** – A drawing showing a visual representation in two dimensions of a three-dimensional piping model. The horizontal plane is drawn at an angle of 30 degrees and the vertical at 90 degrees.
- **Long Section** – A side profile view of the pipeline, showing its vertical position over a distance and other assets and services in the area.
- **General Arrangement (GA)** – Shows a detailed plan, views, elevation, and sections of the complete service or equipment layout (including high-level structural and mechanical elements).
- **Process Flow Diagram (PFDs)** – Shows all major equipment and general piping flow indications. It shows basic operating conditions; pressure, temperature, and flow rate.
- **Piping (Process) and Instrument Diagram (P&IDs)** – Shows greater detailed information used for design purposes (e.g. system specifications, all equipment, pipe sizes, valve types, instrumentation, and controls). P&IDs are created for our infrastructure facilities; treatment plant, pump stations, reservoirs etc.
- **Schematic – Electrical / Loop Schematic** – Shows either the electrical layout system and connections or the Instrumentation loop connection system and layout. These schematics are also part of the supervisory control and data acquisition (SCADA) schematics and documentation. Ref: ISA 5.1 Standard (Instrumentation, Systems and Automation Society).

#### 2.1.2 Drawing Status

Drawings and plans produced for and by Wellington Water follow both an internal and external (Consultants) workflow process. This process has key points when the documents are to be reviewed and approved. The drawing stages are summarised below:



- **Design stage** – the initial stage where all necessary investigations, design calculations, draughting, material specification, work scoping, and testing is performed (refer to the RSWS for further details). As the result of the design work, drawings and scope of work packages are “Issued for Construction (IFC).”
- **Issued for Construction (IFC) stage** – when the drawing is approved and issued to Contractors to carry out the planning, procurement, site management and construction as per the scope of work.
- **As-built (AB) stage** – the revised set of drawings and documents submitted upon completion of the project or a particular job. They reflect all changes made in the specifications and working drawings during the construction process, and show the exact dimension, geometry, and location of all elements of the work completed under the contract. These changes may be because of the following:
  - As-found – changes to or discovery of water services during excavation, surveys, or maintenance activities. Changes or discovery of non-water services should be raised with the relevant utility provider.
  - Design change – changes that requires an approved ‘design change order variation’.
  - As-constructed – minor design and construction configuration changes.

After constructed works are surveyed, the original IFC drawing should be amended and issued as As-Built and re-issued for approval prior to project completion.

## 2.2 Creation

### 2.2.1 Drawing / Drafting Standards

All non-minor survey works are to be carried out by a suitably qualified surveyor. Refer to section 2.5.1 for requirements regarding minor works.

Specific guidance around the production of drawings can be found within the Wellington Water Regional Draughting Manual for Water Services (available at <https://www.wellingtonwater.co.nz>).

### 2.2.2 Asset Attributes

Asset attributes, or information pertaining to the specific asset items, is key to the operation and maintenance of the services provided by Wellington Water. Each asset type, their attributes and their available values are outlined within the Appendix to this document.

Attributes and values included within the tables (noted in the appendix to this document) are likely to change over time. Please refer to the Wellington Water website (<https://www.wellingtonwater.co.nz>) for the most up to date version of this document.

### 2.2.3 Datum and Coordinates

All coordinates will need to be in terms of New Zealand Geodetic Datum 2000 (NZGD2000) using one of the following projections:

- New Zealand Transverse Mercator 2000 (NZTM)
- Wellington Circuit 2000 (WELLTM2000)
- Wairarapa Circuit 2000 (WAIRTM2000) (Only applies to South Wairarapa)

All vertical levels must be in terms of New Zealand Vertical Datum 2016 (NZVD2016). From January 2023, Wellington Water will no longer accept as built deliverables that are in terms of Wellington Vertical Datum 1953 (WELLHGT53).

Please ensure that the coordinate system and vertical datum used is clearly noted on the deliverables.

The acceptable level of accuracy for works that are not considered to be minor works (refer to section 2.5.1) is  $\pm 50\text{mm}$  in the horizontal direction and  $\pm 50\text{mm}$  in the vertical direction<sup>2</sup>.

## 2.3 Submission

### 2.3.1 Format

Drawings and plans are to be submitted to Wellington Water with an as-built status to enable Wellington Water to hold a complete record of work carried out, and to simplify the data ingestion process into Wellington Water systems. These are to be provided in the following formats:

- **CAD** - \*.DWG drawing format preferred (but will accept Revit, 12D and Civil 3D files) for all types of drawings except service plans.
- **PDF file** – Portable Document Format generated direct from the CAD programme being used (using the in-built export function) to enable word and data search within the document to assist with the Wellington Water ingestion processes. (NB .SHX Fonts are not to be used as these are not searchable after conversion to PDF).

Wellington Water will approve the use of alternative formats on a case-by-case basis if a project is unable to deliver in the standard formats noted above. The project contractor and consultant will need to contact the Digital Products & Services Team for approval.

### 2.3.2 Drawing and Data Transmittal

Drawing and data records are to be transmitted to Wellington Water via:

- The Wellington Water project or Land Development contact person; or
- The relevant council sub-division approval team (who will then pass the relevant three waters information to Wellington Water); or
- The [asbuilt@wellingtonwater.co.nz](mailto:asbuilt@wellingtonwater.co.nz) email address.

In addition to details produced in a typical as-built site-surveyed drawing, Wellington Water also require other typical details (e.g. special arrangements, non-standard details, location of existing services) to be supplied to support the ongoing safe and efficient operation of assets now and in the future. These additional details are commonly contained within IFC drawings.

There are two ways in which this information can be prepared and submitted to Wellington Water:

1. **One drawing set:** Surveyor updates the pre-construction IFC drawing directly to as-built.
2. **Two drawing sets:** Surveyor produces site specific as-built, and these details are then used by another party to update the pre-construction IFC drawing to as-built status.

Drawing records must be supplied to Wellington Water in both CAD and PDF (searchable) formats. Hard copies are not required to be supplied.

---

<sup>2</sup> The National Code of Practice for Utility Operators Access to Transport Corridors recommends  $\pm 0.3\text{m}$  in the horizontal direction and  $\pm 0.1\text{m}$  in the vertical direction. However, given the accuracy of modern surveying equipment, Wellington Water has chosen to select a higher level of accuracy in consultation with its Consultancy Panel.

## 2.4 Processing and ingestion

### 2.4.1 Data Validation

Data validation is performed to ensure that the asset information and attributes provided on the drawings are consistent with Wellington Water's data requirements. Data validation is performed by the Wellington Water Digital Products & Services (DPS) team upon receipt of the drawing files supplied to the associated Wellington Water Project or Land Development team, or [asbuilt@wellingtonwater.co.nz](mailto:asbuilt@wellingtonwater.co.nz) email address.

### 2.4.2 Ingestion

Once validated, the PDF and CAD drawing files will be filed in Wellington Water's document management system, readily accessible by the Consultancy Panel and client councils.

Asset data will be ingested into Wellington Water's asset management systems, and made publicly available through Wellington Water's [Open Data Portal](#).

### 2.4.3 Requests for information

Future works should utilise existing drawing and asset data records held by Wellington Water. Asset data records are made publicly available through Wellington Water's [Open Data Portal](#). Requests for further information and/or drawings can be made by emailing [data.team@wellingtonwater.co.nz](mailto:data.team@wellingtonwater.co.nz).

## 2.5 Other requirements

### 2.5.1 Minor works

In several scenarios, it is not cost effective for a developer or contractor to engage a surveyor to survey works performed. In such cases, it is important Wellington Water still receives details of what work has been performed to update our asset management systems.

The Wellington Water project representative will determine if the works are considered minor or not. If you do not consider the work to require a surveyor to be engaged, please discuss this with your Wellington Water project representative.

For such works, it is acceptable for a sketch or other form of drawing to be submitted provided that it includes:

- Details of all work performed.
- Location measurements taken from the kerb, manhole, or other relevant point of reference to allow Wellington Water to spatially represent the location of the asset(s).

Some examples of minor works are listed below. Please note this is not an exhaustive list of scenarios that do not require a surveyor to be engaged.

- Installation of public drainage chambers or manholes
- Renewal of public drains between two manholes to the same grade and alignment (limited to a single section for one project)
- Isolated rehabilitation of existing pipe or manhole
- Raising or lowering a public manhole lid
- Connection to services
- Short extension of public main to serve, for example, two lots upstream

New water connections and meters are also considered to be minor works, but drawings must be submitted alongside the New Connection As-built Form (available at <https://www.wellingtonwater.co.nz>).

### 2.5.2 Existing assets

Connections and alterations of the existing network are clearly identified (using the labels noted in section 3.1). Ensure assets that are abandoned or removed are included.

### 2.5.3 Facility / Plant structures

All facility drawings (including electrical schematics) are also required in .dwg format to enable changes to be made by Wellington Water or engaged parties (as these components or layouts may need to be modified in the future for operational and servicing requirements).

The following information about treatment plants, reservoirs / storage tanks, pump stations and other structures (such as intakes or wells) must be provided in as-built form:

- General Arrangement Plans
- Structural Plans
- Mechanical Plans
- P&IDs
- Electrical Drawings
- PFD
- Services plan / plot plan
- Operation and maintenance (O&M) manuals

In lieu of a specification that defines the drawing and data requirements for assets specific to a facility or plant site, these requirements must be agreed upfront for each individual facility / plant project.

### 2.5.4 On-site treatment

Where on-site treatment is proposed, drawings are required outlining:

- Effluent treatment areas proposed
- Flood levels in design event
- Proximity of any natural body of water
- Method and layout of irrigation

Private on-site treatment is not governed by Wellington Water. Please contact your local council for the requirements as part of the building consents process.

## 2.6 Future improvements

As a result of investigations into more efficient ways of working, it was determined that the majority of surveyors contracted or subcontracted are using 12d software for survey data capture and design layout. As a result, Wellington Water have worked with 12d NZ Ltd to build an adapted version of the New Zealand Asset Management Standard (NZAMS) directly into the 12d software (in the form of dropdowns and menus). This will make it easy to incorporate the correct metadata into all drawings.

Once rolled out, any surveyor using the 12d software will be encouraged to utilise the Wellington Water Field Data file to allow drawings to self-validate, to simplify the submission process for surveyors, and to simplify the process for Wellington Water to ingest this information into the asset management systems.

The 12d submission process is currently in beta. When fully rolled out, the 12d Field Data file will be available from either 12d or Wellington Water. **Submission of asset data using 12d will not be a requirement.**

Wellington Water will provide an update to this specification with the additional file requirement and process changes listed below for those that choose to submit via this new method.

### 2.6.1 Future format requirements

Those using the 12d software and the Field Data file will also be asked to submit a \*.12DXML drawing file from the 12d software, and submit this alongside CAD and PDF drawing versions. This will allow Wellington Water to automatically validate and ingest the associated asset data into our systems. 12d files will be preferred, not required.

### 2.6.2 Future drawing submission process

The \*.12DXML drawing file generated by the surveyor should also be supplied to the Wellington Water project / Land Development contact person (or directly to [asbuilt@wellingtonwater.co.nz](mailto:asbuilt@wellingtonwater.co.nz)) alongside the CAD and PDF versions. This \*.12DXML file will enable the automatic validation and ingestion of asset data into Wellington Water systems.

### 2.6.3 Future data validation process

Those using the 12d software and the Field Data file will have their drawings automatically validated by the 12d software at the point of creation.

## 3 Detailed As-built specifications

All as-built submissions must include the information detailed in the following sections at a minimum. This can be either on the drawing or within an associated data sheet<sup>3</sup> as recommended in the tables below.

Future digital as-built submissions via the 12D Wellington Water plug-in will include most of this information by default.

The following sections should be read in conjunction with the Wellington Water Regional Draughting Manual for Water Services (available at <https://www.wellingtonwater.co.nz>).

### 3.1 All Waters

#### 3.1.1 Generic

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Cover sheet with project name, drawing list and map showing extent of project work location   | Preferred             | Drawing                     |
| North arrow   | Required              | Drawing                     |
| Legal boundaries, legal descriptions of parcels, road names and property address numbers (or lot numbers if address unavailable) <sup>4</sup> | Required              | Drawing                     |
| Drawing number  | Required              | Drawing                     |
| Contractor name   | Required              | Notes Section               |
| Consultant name   | Required              | Notes Section               |
| Surveyor name and company name  | Required              | Notes Section               |
| Project number  | Required              | Notes Section/Drawing       |
| Project title (or subdivision name and stage number)  | Required              | Notes Section/Drawing       |
| Project location  | Required              | Drawing                     |
| Date of installation (month and year)   | Required              | Notes Section/Drawing       |
| General notes box to reduce clutter on plans  | Required              | N/A                         |
| Scale and scale bar at A1 and A3 page sizes (not applicable for schematics)   | Required              | Drawing                     |
| Datum used as outlined in Section 2.2.3   | Required              | Notes Section               |
| Survey origin point   | Required              | Notes Section               |
| Existing assets are clearly identified as "Existing"  | Required              | Drawing                     |

<sup>3</sup> A data sheet is a separate table (produced as part of a drawing set) that lists all assets related to the drawing, alongside the required attribute data. Refer to section 5 of this document for an example.

<sup>4</sup> If pipelines intersect with buildings and an aerial view is not included, then ensure building outlines are clearly shown.

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Removed assets are clearly identified as "Removed"  | Required              | Drawing                     |
| Abandoned assets are clearly identified as "Abandoned"  | Required              | Drawing                     |
| Private assets are clearly identified as "Private"  | Required              | Drawing                     |
| Found assets (not shown on existing records) are clearly identified as "Found"  | Required              | Drawing                     |
| Connections to existing networks  | Required              | Drawing                     |
| Location of other services that run parallel or cross within 100mm of Wellington Water managed assets <sup>5</sup>  | Required              | Drawing                     |
| Identification of hazardous assets (e.g. abandoned Asbestos Cement Pipes, 11kW/33kW electricity assets)   | Required              | Drawing                     |
| Extent of any easements created for the purpose of conveying water or drainage assets   | Preferred             | Drawing                     |
| Clear identification and detail of any thrust or anchor blocks, bulk heads, waterstops, above ground (exposed) sections of pipe, and non-standard installations | Required              | Drawing                     |
| Trench and installation method details including materials  | Required              | Notes Section               |
| Asset coordinate table (showing X, Y and reduced levels)  | Preferred             | Drawing/Data Sheet          |
| Kerb lines  | Preferred             | Drawing                     |

### 3.1.2 Pipes

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Manufacturer   | Preferred             | Notes Section/Data Sheet    |
| Nominal diameter   | Required              | Drawing/Notes/Data Sheet    |
| Material (including any lining or external materials) <sup>6</sup> | Required              | Drawing/Notes/Data Sheet    |
| Retrospective lining – material and method                         | Required              | Drawing/Notes/Data Sheet    |
| Classification (PN or SN and SDR where applicable)                 | Required              | Drawing/Notes/Data Sheet    |
| Pipe joint type  | Required              | Drawing/Notes/Data Sheet    |
| Pipes removed, abandoned, or found                                 | Required              | Drawing                     |
| Pipeline design (test) pressure                                    | Preferred             | Notes/Data Sheet            |
| Flange drilling standard (if applicable)                           | Preferred             | Notes/Data Sheet            |

<sup>5</sup> Location of other services do not need to be formally surveyed, but their indicative locations must be included.

<sup>6</sup> Ensure the specific pipe material is clearly stated (e.g. do not note uPVC on its own, also include the series number (S1, S2)).

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Pipe length between nodes  | Optional              | Drawing                     |
| For labelling of pipes, use the general notes section where possible (e.g. all Rider mains are iPlex 63mm OD (50mm ID) PE100 PN16 with Electrofusion Joints) | Required              | Notes                       |

### 3.1.3 Valves

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Manufacturer and model  | Required              | Data Sheet                  |
| Serial number   | Preferred             | Data Sheet                  |
| Valve type (e.g. double air valve)  | Required              | Drawing/Data Sheet          |
| Nominal diameter  | Required              | Drawing/Data Sheet          |
| Material  | Preferred             | Data Sheet                  |
| Closing direction (anti-clockwise is typical for water supply, and clockwise for wastewater and stormwater) | Required              | Data Sheet                  |

### 3.1.4 Meters

| Information                            | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Manufacturer and model                 | Required              | Data Sheet                  |
| Serial number                          | Preferred             | Data Sheet                  |
| Meter type (e.g. DMA)                  | Required              | Drawing/Data Sheet          |
| Meter mechanism (e.g. electromagnetic) | Required              | Data Sheet                  |
| Nominal diameter                       | Required              | Data Sheet                  |

### 3.1.5 Fittings

| Information  | Required or preferred | Recommended record location |
|--------------|-----------------------|-----------------------------|
| Fitting type | Required              | Drawing/Data Sheet          |
| Material     | Preferred             | Data Sheet                  |
| Diameter     | Required              | Data Sheet                  |
| Manufacturer | Preferred             | Data Sheet                  |

### 3.1.6 Chambers and Structures

Includes chambers, manholes, lamp holes, cleaning eyes, and headwalls.



| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Diameter (if circular)   | Required              | Drawing/Data Sheet          |
| Width and depth (if non-circular)  | Required              | Drawing/Data Sheet          |
| Depth (and height if applicable)   | Required              | Drawing/Data Sheet          |
| Lid / top level  | Required              | Drawing/Data Sheet          |
| Shape  | Required              | Data Sheet                  |
| Material   | Required              | Data Sheet                  |
| Manufacturer   | Preferred             | Data Sheet                  |
| Provide structural as-built detail if non-standard or modified structure | Required              | Drawing                     |

## 3.2 Water Supply

Water supply requirements include all the infrastructure, pipework and equipment that takes raw water from source, stores it, and then treats it before reticulation to customers. It includes intakes, raw water mains, water treatment plants (WTP) and facilities, inlets or riser mains, and reservoirs, as well as details and location of pipes, channels, fittings, and trench and fill details. Further specific definitions for these elements and included asset groups can be found in the RSWS.

The below requirements are **in addition** to those stated under section 2 of this document, and the guidance included within Regional Draughting Manual for Water Services.

### 3.2.1 Pipes

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Pipe-use clearly identified (e.g. bulk main, trunk main, main, ridermain, service connection, or scour) | Required              | Drawing/Data Sheet          |
| Classification (PN or SN and SDR where applicable)  | Required              | Drawing/Notes/Data Sheet    |
| Pipe joint type   | Required              | Drawing/Notes/Data Sheet    |
| Depth of cover  | Required              | Drawing/Notes/Data Sheet    |

### 3.2.2 Long sections

Long sections are required for all trunk or bulk water pipes.

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Ground levels in terms of the datum used  | Required              | Drawing                     |
| Levels (pipe depth) to the top of pipe (T.O.P.) at all changes of grade, and at intermediate points no more than 36 m apart | Required              | Drawing                     |
| Grades  | Required              | Drawing                     |
| Running length (increasing in the normal flow direction and left to right on the drawing)                                   | Required              | Drawing                     |

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Position of horizontal and vertical bends  | Required              | Drawing                     |
| Position of all fixed assets including valves, branches, access points, chambers, and pipe joints  | Required              | Drawing                     |
| Valves are to be identified by their diameter and mechanism (e.g. 50mm double air valve)   | Required              | Drawing                     |
| Branches are to be identified by their equal or unequal diameters (e.g. 600/300 Tee)   | Required              | Drawing                     |
| Access points are to be identified by their diameter (e.g. 600mm access point)   | Required              | Drawing                     |
| Chambers are to be identified by their diameter, depth and material (e.g. 1200mm Dia. 1800 mm deep RCON Chamber)   | Required              | Drawing                     |
| Pipe joints are to be identified by their joint type (e.g. Gibault joint)  | Required              | Drawing                     |
| Pipe details including internal, nominal and external diameters, material including any linings and coatings, and pipe class (if applicable) (e.g. 200mm (232 OD) DICL PN35) | Required              | Drawing                     |
| Flange drilling standard (if applicable)   | Preferred             | Drawing                     |
| Thrust block dimensions  | Preferred             | Drawing                     |
| Cathodic protection features   | Required              | Drawing                     |
| Position of other existing or proposed services  | Preferred             | Drawing                     |

### 3.2.3 Valves

- No additional requirements. See section 3.1.3.

### 3.2.4 Hydrants

| Information            | Required or preferred | Recommended record location |
|------------------------|-----------------------|-----------------------------|
| Manufacturer and model | Required              | Notes/Data Sheet            |
| Serial number          | Preferred             | Notes/Data Sheet            |
| Hydrant type           | Required              | Notes/Data Sheet            |
| Barrell diameter       | Preferred             | Notes/Data Sheet            |
| Riser diameter         | Preferred             | Notes/Data Sheet            |

### 3.2.5 Meters

- No additional requirements. See section 3.1.4.

### 3.2.6 Fittings

- No additional requirements. See section 3.1.5.

### 3.2.7 Chambers and Structures

- No additional requirements. See section 3.1.6.

### 3.2.8 Pressure management (PCV/PRV) Arrangements

| Information   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Include valve and chamber requirements                      | Required              | Drawing/Notes/Data Sheet    |
| Upstream and downstream pressures                           | Required              | Notes/Data Sheet            |
| Location of relief valve discharge pipeline (if applicable) | Required              | Drawing                     |

### 3.2.9 Flow meter arrangements

| Information                                   | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Include valve, meter and chamber requirements | Required              | Drawing/Notes/Data Sheet    |
| Details of control cabinet and plinth         | Required              | Drawing                     |
| Location of cable ducting                     | Required              | Drawing                     |

## 3.3 Wastewater

Wastewater requirements include all the infrastructure, pipework, and equipment that services customers from property boundary, to the wastewater treatment plant, and then onto the approved discharge location. It includes details and location of pipes, channels, laterals, valves, fittings, and trench and fill details. Further specific definitions for these elements and included asset groups can be found in the RSWS.

The below requirements are in addition to those stated under section 2 of this document, and the guidance included within Regional Draughting Manual for Water Services.

### 3.3.1 Pipes

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Pipe use clearly identified (e.g. Trunk Main, Rising Main, Reticulation Main, Lateral, or Scour)   | Required              | Drawing/Data Sheet          |
| Upstream and downstream invert levels  | Required              | Drawing/Data Sheet          |
| Flow direction clearly identified  | Required              | Drawing                     |
| Position of any change of grade (COG) or change of direction (COD), with levels (including invert)   | Required              | Drawing                     |
| Gradient (or enough information to calculate)  | Required              | Drawing                     |
| For household drainage, clearly identify sumps, gully traps, vents, bends, inspection points, and the house being served by the connection | Preferred             | Drawing                     |

### 3.3.2 Long Sections

Long sections are preferred in addition to data sheets for wastewater but are optional (they are only required for trunk / bulk water mains – see section 3.2.2). If long sections are provided for wastewater, refer to the table below for requirements.

Long sections shall be drawn with the chainage starting at the downstream end of the drain and the upstream point of the drain to the right of the drawing (unless with good reason). This represents the way the drain would normally be constructed.

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Details of all proposed and existing depths                                  | Required              | Drawing                     |
| Levels, grades, diameters, and materials of the pipelines in terms of datum  | Required              | Drawing/Data Sheet          |
| Material, depth, diameter, and levels of manholes                            | Required              | Drawing/Data Sheet          |
| Where possible, include proximity of any other existing or proposed services | Preferred             | Drawing                     |

### 3.3.3 Valves

- No additional requirements. See section 3.1.3.

### 3.3.4 Meters

- No additional requirements. See section 3.1.4.

### 3.3.5 Fittings

- No additional requirements. See section 3.1.5.

### 3.3.6 Chambers and Structures

In addition to the requirements in section 3.1.6:

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Include depth to invert levels on all manholes, cleaning eyes, and incoming and outgoing pipes | Required              | Drawing/Data Sheet          |
| Include details of specific flow control additions such as weirs and orifices                  | Required              | Drawing                     |

## 3.4 Stormwater

Stormwater requirements include all the infrastructure, pipework, and equipment that services customers from property boundary to the approved discharge location. It includes details and location of pipes, channels, fittings, and trench and fill details. Further specific definitions for these elements and included asset groups can be found in the RSWS.

The below requirements are in addition to those stated under section 2 of this document, and the guidance included within Regional Draughting Manual for Water Services.

### 3.4.1 Pipes

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Pipe use clearly identified (e.g. Trunk Main, Rising Main, Reticulation Main, Lateral, or Scour)   | Required              | Drawing/Notes/Data Sheet    |
| Upstream and downstream invert levels  | Required              | Drawing/Data Sheet          |
| Flow direction clearly identified  | Required              | Drawing                     |
| Position of any change of grade (COG) or change of direction (COD), with levels (including invert)   | Required              | Drawing                     |
| Gradient (or enough information to calculate)  | Required              | Drawing                     |
| For household drainage, clearly identify sumps, gully traps, vents, bends, inspection points, and the house being served by the connection | Preferred             | Drawing                     |

### 3.4.2 Long sections

Long sections are preferred in addition to data sheets for stormwater but are optional (they are only required for trunk / bulk water mains – see section 3.2.2). If long sections are provided for stormwater, refer to the table below for requirements.

Long sections shall be drawn with the chainage starting at the downstream end of the drain and the upstream point of the drain to the right of the drawing (unless with good reason, documented). This represents the way the drain would normally be constructed.

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Details of all proposed and existing depths                                  | Required              | Drawing                     |
| Levels, grades, diameters and materials of the pipelines in terms of datum   | Required              | Drawing/Data Sheet          |
| Material, depth, diameter, and levels of manholes                            | Required              | Drawing/Data Sheet          |
| Where possible, include proximity of any other existing or proposed services | Preferred             | Drawing                     |

### 3.4.3 Valves

- No additional requirements. See section 3.1.3.

### 3.4.4 Meters

- No additional requirements. See section 3.1.4.

### 3.4.5 Fittings

- No additional requirements. See section 3.1.5.

### 3.4.6 Chambers and Structures

In addition to the requirements in section 3.1.6:

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Include depth to invert levels on all manholes, cleaning eyes, and incoming and outgoing pipes | Required              | Drawing/Data Sheet          |
| Include details of specific flow control additions such as weirs and orifices                  | Required              | Drawing                     |

### 3.4.7 Inlet / outlet structures

| Information                            | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| Invert levels of ingoing/outgoing pipe | Required              | Drawing/Data Sheet          |
| Protection (e.g. grill)                | Required              | Data Sheet                  |

### 3.4.8 Waterways / channels

| Information                     | Required or preferred | Recommended record location |
|---------------------------------|-----------------------|-----------------------------|
| Waterway type                   | Required              | Drawing/Data Sheet          |
| Waterway alignment (centreline) | Required              | Drawing                     |
| Direction of flow               | Required              | Drawing                     |
| Base width                      | Required              | Drawing/Data Sheet          |
| Top width                       | Required              | Drawing/Data Sheet          |
| Depth                           | Preferred             | Data Sheet                  |
| Points of confluence/difluence  | Required              | Drawing                     |

### 3.4.9 Rain gardens / soak pits / ponds / wetlands

| Information                                     | Required or preferred | Recommended record location |
|---|-----------------------|-----------------------------|
| Dimensions and extent of object                 | Required              | Drawing/Data Sheet          |
| Storage capacity                                | Required              | Drawing/Data Sheet          |
| Materials for each layer (cross section detail) | Required              | Drawing                     |

### 3.4.10 Catchment Plan

Details must be provided if major earthworks changing the ground levels were involved:

| Information  | Required or preferred | Recommended record location |
|--|-----------------------|-----------------------------|
| New flood extent maps  | Preferred             | Drawing                     |
| Include secondary overland flow paths and calculated flow depths | Preferred             | Drawing                     |

## 4 Glossary & definitions

### 4.1 NZAMS Terms and Descriptions

Relevant terms and descriptions included within the New Zealand Asset Metadata Standard (NZAMS) (Volume 1 – As-constructed / As-built) are included in the table below.

*Table key: Water Supply (PW), Wastewater (WW) and Stormwater (SW) manuals.*

| Term                | Description  | Service  |
|---------------------|--|----------|
| Access chamber      | Also referred to as a chamber, manhole, access point, Well, or maintenance hole.   | PW WW SW |
| Access points       | Also referred to as a manhole, pit, maintenance hole, inspection opening, lamp hole or access chamber.                             | PW WW SW |
| AMIS                | Asset Management Information System. May also be referred to as Asset Management System (AMS).                                     | PW WW SW |
| As-constructed      | The result of construction work to install assets in relation to construction drawings and scopes of work.                         | PW WW SW |
| As-Found            | Data captured during routine or reactive maintenance activities of as-constructed assets.  | PW WW SW |
| As-built            | Data captured for newly installed as-constructed assets. This also takes into account renewed or rehabilitated assets.             | PW WW SW |
| Asset Class         | A grouping of assets that can be covered by a specific classification and can be described by the same attributes.                 | PW WW SW |
| Asset Group         | A high level classification grouping of asset classes.   | PW WW SW |
| Asset Type          | Relates to a specific type of asset within an asset class.   | PW WW SW |
| CCTV                | Closed circuit television.   | PW WW SW |
| Drainage (networks) | Stormwater or wastewater network systems.  | WW SW    |
| End of Pipe         | May also be referred to as blank or cap end.   | WW SW    |
| FSL                 | Finished Surface Level (e.g. lid elevation).   | PW WW SW |
| GA                  | General Arrangement drawing.   | N/A      |
| Installation date   | May also be referred to as construction date.  | PW WW SW |
| Invert Level (IL)   | Invert Level based on a vertical datum elevation.  | PW WW SW |
| LINZ                | Land Information New Zealand.  | PW WW SW |
| NIU                 | National Infrastructure Unit of Treasury New Zealand.  | PW WW SW |
| Node                | In the context of this specification, is the start point (from node) or the end point (to node) of the pressure main pipe network. | PW       |
| NZTM2000            | New Zealand Transverse Mercator 2000 projection.   | PW WW SW |
| NZVD2016            | New Zealand Vertical Datum published in 2016.  | PW WW SW |
| Pipes               | May also be referred to as a Bulk, Trunk, Transmission, Main, Rider or Pressure/Gravity main.                                      | PW       |
| Water Supply (PW)   | Drinking water as defined in the Health (Drinking Water Amendment) Act 2007.   | PW       |
| Plot Plan           | Plan view of proposed or actual assets in relation to each other.  | N/A      |

| Term  | Description  | Service  |
|---|--|----------|
| Pressure mains                              | All PW Main and SW & WW rising mains.  | PW WW SW |
| Property connection                         | Lateral connection, service connection, service line, property discharge lines or house connection branch (HCB).   | PW WW SW |
| Property sanitary drain                     | Property service drain.  | WW       |
| Raw Water (RW)                              | Untreated water and is a sub-group of the Water Supply asset service group.  | PW       |
| Reduced Level (RL)                          | Reduced level based on a vertical datum.   | PW WW SW |
| Recycled water                              | May also be referred to as reuse water or reclaimed water.   | PW       |
| Stormwater (SW)                             | Rainwater that does not percolate into the groundwater or evaporate, but flows via overland flow, interflow, channels or pipes into a defined channel, open watercourse, or a constructed infiltration facility. | SW       |
| Sewer maintenance shaft                     | Access point; inspection shaft or lamp hole.   | WW       |
| Stormwater Treatment Device (SWTD)          | Ref: Water Sensitive Design for Stormwater: Treatment Device Design Guideline – April 2019.  | SW       |
| Vertical Datum                              | A reference surface for vertical positions. Both WELLHT1953 and NZVD2016 are accepted by Wellington Water.   | N/A      |
| Wastewater (WW)                             | Water that has been used and contains unwanted dissolved and/or suspended substances from communities, including homes and businesses and industries.  | WW       |
| Well  | May also be referred to as a bore or bore hole or water well.  | PW       |
| Wellington Vertical Datum 1953 (WELLHT1953) | Legacy local vertical datum, referenced to local mean sea levels (MSL).  | PW WW SW |

## 5 Examples

### 5.1 Data Sheet

A data sheet is a separate table (produced as part of a drawing set) that lists all assets related to the drawing, alongside the required attribute data. Typically, this is produced in Excel with each tab referring to different asset types (e.g. valve, pipe).

An example of such a table is shown below, showing the required asset attribute information for a valve (as per 3.1.2).

| Ref | Asset Type | Valve Type       | Diameter | Material | Manufacturer | Model | Serial Number | Closing direction | X           | Y           | RL     |
|-----|------------|------------------|----------|----------|--------------|-------|---------------|-------------------|-------------|-------------|--------|
| 1   | Valve      | Gate Valve       | 200mm    | DI       | Hawle        | E2    | 12345         | Clockwise         | 1745296.320 | 5435131.202 | 45.2m  |
| 2   | Valve      | Single Air Valve | 25mm     | SS       | Bermad       | C50   | 654321        | N/A               | 1759737.564 | 5445492.632 | 114.0m |



# Appendix

## 1. Asset attributes

Asset attributes associated with specify asset types have been grouped into the specific three water systems. These being: Water Supply (PW), Wastewater (WW) and Stormwater (SW).

### 1.1. Common-Block

The Common Block is a block that contains common attributes from each separate asset item. The attributes for this block are then appended to each asset item as they are extracted for validation and ultimately loaded into Wellington Water's asset management system for sharing with our Clients and Customers.

| BLOCK_NAME   | TAG_NAME    | Description   | Default  | LU_TABLE_NAME   |
|--------------|-------------|---|----------|-----------------|
| Common-Block | OWNER       | The council or authority asset owner                              | -        | 5.1 LU_3W_OWNER |
| Common-Block | CONST_CO    | Construction company name.  | -        | NULL            |
| Common-Block | CONST_DATE  | Construction date.  | -        | NULL            |
| Common-Block | DESIGN_CO   | Design company name only.   | -        | NULL            |
| Common-Block | DRAWING_NO  | Drawing number.   | -        | NULL            |
| Common-Block | COORDINATES | Coordinates are in terms of.                                      | NZTM2000 | NULL            |
| Common-Block | DATUM       | Datum is in terms of.   | NZVD2016 | NULL            |
| Common-Block | SOURCE      | Project setting out co-ordinates and elevation (N E & RL).        | -        | NULL            |
| Common-Block | STAGE_NO    | Subdivision Consent Reference or WWL Project Number stage number. | -        | NULL            |
| Common-Block | SUB_NAME    | Subdivision Name or Project Name.                                 | -        | NULL            |

### 1.2. Area of Work

A Polygon showing the area of work for a specific project where the services have been updated, added, or removed.

| BLOCK_NAME      | TAG_NAME | Description  | Default | LU_TABLE_NAME |
|-----------------|----------|--|---------|---------------|
| WW-Area-of-Work | COMMENTS | Any additional comments that relate to this work extent. | -       | NULL          |
| PW-Area-of-Work | COMMENTS | Any additional comments that relate to this work extent. | -       | NULL          |
| SW-Area-of-Work | COMMENTS | Any additional comments that relate to this work extent. | -       | NULL          |

## 2. Water Supply (PW) assets

### 2.1. PW-Pipes

The water supply main used to convey water from one point to another throughout a network by means of pumped pressure or gravity (head pressure). Pipes are the primary asset in each specific network, hence the data captured here is imparted to all connecting assets and equipment.

| BLOCK_NAME | TAG_NAME     | Description  | Default | LU_TABLE_NAME          |
|------------|--------------|--|---------|------------------------|
| PW-Pipes   | PIPE_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL                   |
| PW-Pipes   | LOCATION     | Physical Location of the asset.                          | -       | NULL                   |
| PW-Pipes   | UTILITY      | * Water Service (RW PW WW SW GW)                         | PW      | LU_3W_UTILITY          |
| PW-Pipes   | UTILITY_TYPE | * Water Service Network                                  | PWDB    | LU_3W_UTILITY_TYPE     |
| PW-Pipes   | USAGE        | * Pipe Operational Function                              | PRES    | LU_3W_PIPE_USE         |
| PW-Pipes   | PIPE_TYPE    | * Pipe Operational Function                              | MAIN    | LU_PW_PIPE_TYPE        |
| PW-Pipes   | STATUS       | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS        |
| PW-Pipes   | FROM_NODE    | *Start point Node Number.                                | -       | NULL                   |
| PW-Pipes   | TO_NODE      | *End point Node Number.                                  | -       | NULL                   |
| PW-Pipes   | SIZE         | *Nominal Size of the PIPE (DN value).                    | -       | NULL                   |
| PW-Pipes   | CLASS        | * Pipe Classification (Specification)                    | -       | LU_3W_CLASSIFICATION   |
| PW-Pipes   | MANUFACT     | Manufacturer of the asset.                               | -       | NULL                   |
| PW-Pipes   | MATERIAL     | * Material of Construction                               | -       | LU_3W_MATERIAL         |
| PW-Pipes   | COATING      | Type of External Coating material applied                | -       | LU_3W_COATING          |
| PW-Pipes   | LINING       | Type of Internal Lining material applied                 | NA      | LU_3W_LINING           |
| PW-Pipes   | JOINT_TYPE   | * Pipe/Fitting Connection Method                         | -       | LU_3W_PIPE_JOINT_TYPE  |
| PW-Pipes   | INSTL_MTD    | * Pipe installation method.                              | TREN    | LU_3W_PIPEINSTALL      |
| PW-Pipes   | GRND_TYPE    | * General Classification of the Ground Material          | -       | LU_3W_GRND_TYPE        |
| PW-Pipes   | BACKFILL     | * Backfill Material                                      | AP40    | LU_3W_BED_BACKFILL_MAT |
| PW-Pipes   | BEDDING      | * Bedding Material                                       | 5_20    | LU_3W_BED_BACKFILL_MAT |
| PW-Pipes   | COMMENTS     | Any additional comments that relate to this work extent. | -       | NULL                   |

### 2.2. Service Mains/Connections

Water service mains are the connection from the water supply main to a residential or business user.

| BLOCK_NAME       | TAG_NAME   | Description  | Default | LU_TABLE_NAME         |
|------------------|------------|--|---------|-----------------------|
| PW-Service-Mains | PIPE_NO    | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL                  |
| PW-Service-Mains | LOCATION   | Physical Location of the asset.                          | -       | NULL                  |
| PW-Service-Mains | LOT_NO     | *Property Address or Lot number.                         | -       | NULL                  |
| PW-Service-Mains | TYPE       | * The Type of Service User                               | RESL    | LU_3W_ENDUSER_TYPE    |
| PW-Service-Mains | WATER_TYPE | * Water Service (RW PW WW SW GW)                         | PW      | LU_3W_UTILITY         |
| PW-Service-Mains | STATUS     | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS       |
| PW-Service-Mains | PIPE_TYPE  | * Pipe Operational Function                              | SERV    | LU_PW_PIPE_TYPE       |
| PW-Service-Mains | SIZE       | *Nominal Size of the PIPE (DN value).                    | -       | NULL                  |
| PW-Service-Mains | JOINT_TYPE | * Pipe/Fitting Connection Method                         | -       | LU_3W_PIPE_JOINT_TYPE |
| PW-Service-Mains | MATERIAL   | * Material of Construction                               | -       | LU_3W_MATERIAL        |
| PW-Service-Mains | COMMENTS   | Any additional comments that relate to this work extent. | -       | NULL                  |

### 2.3. Fittings

Pipeline fittings are items or nodes that facilitate the connectivity of the water network.

| BLOCK_NAME  | TAG_NAME  | Description   | Default | LU_TABLE_NAME      |
|-------------|-----------|---|---------|--------------------|
| PW-Fittings | NODE_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.      | -       | NULL               |
| PW-Fittings | TYPE      | * Fitting Type  | -       | LU_3W_FITTING_TYPE |
| PW-Fittings | STATUS    | * Assets Operational Status                                 | INUS    | LU_3W_OP_STATUS    |
| PW-Fittings | INT_DIAM1 | *Nominal Size of the Pipe Fitting (DN value)                | -       | NULL               |
| PW-Fittings | INT_DIAM2 | *Nominal Size of the Tee Branch or Reduced size (DN value). | -       | NULL               |
| PW-Fittings | EASTING   | *Easting (X) - Auto populated                               | -       | NULL               |
| PW-Fittings | NORTHING  | *Northing (Y)- Auto populated                               | -       | NULL               |
| PW-Fittings | MATERIAL  | * Material of Construction                                  | -       | LU_3W_MATERIAL     |
| PW-Fittings | COMMENTS  | Any additional comments that relate to item                 | -       | NULL               |

### 2.4. Valves

Valves are to control and/or isolate the water flow throughout the water network. These are placed at the end of pipeline sections.

| BLOCK_NAME | TAG_NAME   | Description  | Default | LU_TABLE_NAME    |
|------------|------------|--|---------|------------------|
| PW-Valves  | VALVE_NO   | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL             |
| PW-Valves  | LOCATION   | Physical Location of the asset.                        | -       | NULL             |
| PW-Valves  | VALVE_TYPE | * Specific Valve Type                                  | GATE    | LU_PW_VALVE_TYPE |

| BLOCK_NAME | TAG_NAME      | Description   | Default       | LU_TABLE_NAME       |
|------------|---------------|---|---------------|---------------------|
| PW-Valves  | VALVE_PURPOSE | * Specific Valve Purpose (what it does)                     | ISOLT         | LU_3W_VALVE_PURPOSE |
| PW-Valves  | VALVE_CONTROL | Valve Actuation   | MANU          | LU_3W_VALVE_CONTROL |
| PW-Valves  | VALVE_STATUS  | * Valve Normal Operation Mode (NO NC LO LC)                 | NO            | LU_3W_VALVE_STATUS  |
| PW-Valves  | VALVE_USE     | * Valve Operational Function                                | PRES          | LU_3W_VALVE_USE     |
| PW-Valves  | STATUS        | * Assets Operational Status                                 | INUS          | LU_3W_OP_STATUS     |
| PW-Valves  | SIZE          | *Nominal Size of the VALVE (DN value).                      | -             | NULL                |
| PW-Valves  | CLOSE_DIR     | *Close direction of the valve.                              | Anticlockwise | NULL                |
| PW-Valves  | MANUFACT      | Manufacturer of the valve.                                  | -             | NULL                |
| PW-Valves  | MATERIAL      | Material of Construction                                    | DI            | LU_3W_MATERIAL      |
| PW-Valves  | COATING       | Type of External Coating material applied                   | PANT          | LU_3W_COATING       |
| PW-Valves  | TELEMETRY     | *Indicates if the VALVE is connected to a telemetry system. | N             | NULL                |
| PW-Valves  | EASTING       | *Easting (X) - Auto populated                               | -             | NULL                |
| PW-Valves  | NORTHING      | *Northing (Y)- Auto populated                               | -             | NULL                |
| PW-Valves  | COMMENTS      | Any additional comments that relate to this work extent.    | -             | NULL                |

## 2.5. Hydrants

Hydrants are a specific type of valve used to either assist with the operation of the network or mainly to provide the provision of water in the event of a fire.

| BLOCK_NAME  | TAG_NAME  | Description  | Default | LU_TABLE_NAME      |
|-------------|-----------|--|---------|--------------------|
| PW-Hydrants | HYDR_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL               |
| PW-Hydrants | HYDR_TYPE | * Hydrant Type   | FHTAL   | LU_PW_HYDRANT_TYPE |
| PW-Hydrants | LOCATION  | Physical Location of the asset.                          | -       | NULL               |
| PW-Hydrants | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS    |
| PW-Hydrants | MODEL     | *Model of the Hydrant                                    | -       | NULL               |
| PW-Hydrants | MANUFACT  | *Manufacturer of the asset.                              | -       | NULL               |
| PW-Hydrants | AV_FLOW   | Available flow of water from the hydrant in kilopascals. | -       | NULL               |
| PW-Hydrants | EASTING   | *Easting (X) - Auto populated                            | -       | NULL               |
| PW-Hydrants | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL               |
| PW-Hydrants | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL               |

## 2.6. Meters

Meters are items of equipment that are placed at specific locations across the network to measure the volumetric flow to an area or facility.

| BLOCK_NAME | TAG_NAME   | Description   | Default | LU_TABLE_NAME         |
|------------|------------|---|---------|-----------------------|
| PW-Meters  | MTR_NO     | * WELLINGTON WATER Asset No or Project defined Ref No.      | -       | NULL                  |
| PW-Meters  | WATER_TYPE | * Water Service (RW PW WW SW GW)                            | PW      | LU_3W_UTILITY         |
| PW-Meters  | LOCATION   | Physical Location of the asset.                             | -       | NULL                  |
| PW-Meters  | LOT_NO     | Property Address or Lot number.                             | -       | NULL                  |
| PW-Meters  | STATUS     | * Assets Operational Status                                 | INUS    | LU_3W_OP_STATUS       |
| PW-Meters  | METER_TYPE | * The Specific Customer Group being Metered                 | DMA     | LU_PW_METER_TYPE      |
| PW-Meters  | MECHANISM  | * The Specific Operational Type of Meter                    | -       | LU_3W_METER_MECHANISM |
| PW-Meters  | SERIAL_NO  | *Serial number of the meter.                                | -       | NULL                  |
| PW-Meters  | SIZE       | *Nominal Size of the METER (DN value).                      | -       | NULL                  |
| PW-Meters  | MODEL      | *Model of the meter.  | -       | NULL                  |
| PW-Meters  | MANUFACT   | *Manufacturer of the asset.                                 | -       | NULL                  |
| PW-Meters  | MATERIAL   | * Material of Construction                                  | -       | LU_3W_MATERIAL        |
| PW-Meters  | TELEMETRY  | *Indicates if the meter is connected to a telemetry system. | Y       | NULL                  |
| PW-Meters  | EASTING    | *Easting (X) - Auto populated                               | -       | NULL                  |
| PW-Meters  | NORTHING   | *Northing (Y)- Auto populated                               | -       | NULL                  |
| PW-Meters  | COMMENTS   | Any additional comments that relate to this work extent.    | -       | NULL                  |

## 2.7. Access Points / Chambers

A chamber or access point that facilitates the ease of operation or maintenance of the water network.

| BLOCK_NAME       | TAG_NAME   | Description   | Default | LU_TABLE_NAME            |
|------------------|------------|---|---------|--------------------------|
| PW-Access-Points | AP_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.          | -       | NULL                     |
| PW-Access-Points | AP_TYPE    | * Specific Type of Access Chamber                               | ACMH    | LU_3W_ACCPOINT_TYPE      |
| PW-Access-Points | LOCATION   | Physical Location of the asset.                                 | -       | NULL                     |
| PW-Access-Points | STATUS     | * Assets Operational Status                                     | INUS    | LU_3W_OP_STATUS          |
| PW-Access-Points | FSL        | *Cover Level (m) - Finished Surface Level (FSL) of Access Point | -       | NULL                     |
| PW-Access-Points | ACCES_DIAM | *The width (mm) of the entrance to the Access Point.            | 600     | NULL                     |
| PW-Access-Points | DIA_WIDTH  | *Diameter or Side width of Access Point / Chamber. (mm)         | 1200    | NULL                     |
| PW-Access-Points | LENGTH     | *Side length of Access Point if not circular.                   | -       | NULL                     |
| PW-Access-Points | COVER_MAT  | * Specific Lid or Cover Material                                | DI      | LU_3W_ACCPOINT_LID_MATRL |
| PW-Access-Points | DEPTH      | *Depth (m) - FSL to bottom of Access Point                      | -       | NULL                     |
| PW-Access-Points | WALL_MAT   | * Material of Construction                                      | CONC    | LU_3W_MATERIAL           |
| PW-Access-Points | FRAME_MAT  | * Material of Construction                                      | -       | LU_3W_MATERIAL           |

| BLOCK_NAME       | TAG_NAME | Description  | Default | LU_TABLE_NAME |
|------------------|----------|--|---------|---------------|
| PW-Access-Points | EASTING  | *Easting (X) - Auto populated                            | -       | NULL          |
| PW-Access-Points | NORTHING | *Northing (Y)- Auto populated                            | -       | NULL          |
| PW-Access-Points | COMMENTS | Any additional comments that relate to this work extent. | -       | NULL          |

## 2.8. Conduit

The piping duct to and from the asset and the conduit access point.

| BLOCK_NAME  | TAG_NAME   | Description  | Default | LU_TABLE_NAME   |
|-------------|------------|--|---------|-----------------|
| PW-Conduits | CONDUIT_NO | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL            |
| PW-Conduits | STATUS     | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| PW-Conduits | SIZE       | *Nominal Size of the PIPE (DN value).                    | -       | NULL            |
| PW-Conduits | MATERIAL   | * Material of Construction                               | uPVC    | LU_3W_MATERIAL  |
| PW-Conduits | ST_PIT_NO  | *Ref No. of the Start Point of Conduit access point.     | -       | NULL            |
| PW-Conduits | EN_PIT_NO  | *Ref No. of the End Point of Conduit access point.       | -       | NULL            |
| PW-Conduits | LENGTH     | *Conduit section length in metres.                       | -       | NULL            |
| PW-Conduits | COMMENTS   | Any additional comments that relate to this work extent. | -       | NULL            |

## 2.9. Conduit Access Points (service chamber)

A chamber that contains non-water services, e.g. electrical or instrument cables, service water (flush lines), compressed air pipelines.

| BLOCK_NAME               | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|--------------------------|-----------|--|---------|-----------------|
| PW-Conduit-Access-Points | CON_AC_NO | * WELLINGTON WATER Asset No or Project defined Ref No.       | -       | NULL            |
| PW-Conduit-Access-Points | STATUS    | * Assets Operational Status                                  | INUS    | LU_3W_OP_STATUS |
| PW-Conduit-Access-Points | MATERIAL  | * Material of Construction                                   | CONC    | LU_3W_MATERIAL  |
| PW-Conduit-Access-Points | DIA_WIDTH | *Diameter or Side width of Access Point / Chamber. (mm)      | 900     | NULL            |
| PW-Conduit-Access-Points | DEPTH     | Depth (m) - Finished Surface Level to bottom of Access Point | -       | NULL            |
| PW-Conduit-Access-Points | EASTING   | *Easting (X) - Auto populated                                | -       | NULL            |
| PW-Conduit-Access-Points | NORTHING  | *Northing (Y)- Auto populated                                | -       | NULL            |
| PW-Conduit-Access-Points | COMMENTS  | Any additional comments that relate to this work extent.     | -       | NULL            |

## 2.10. Pump Stations

Pump stations are an area (polygon) that indicate the location of a pumping station. Enclosed assets are not part of the linear network and can be found on the specific P&ID.

| BLOCK_NAME       | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|------------------|-----------|--|---------|-----------------|
| PW-Pump-Stations | PWPS_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL            |
| PW-Pump-Stations | PWPS_NAME | *Pump Station Name.                                      | -       | NULL            |
| PW-Pump-Stations | NO_PUMPS  | *Number of Pumps.  | -       | NULL            |
| PW-Pump-Stations | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| PW-Pump-Stations | PID_NO    | *Process/Piping and Instrumentation Drawing Number       | -       | NULL            |
| PW-Pump-Stations | EASTING   | *Easting (X) - Auto populated                            | -       | NULL            |
| PW-Pump-Stations | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL            |
| PW-Pump-Stations | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL            |

## 2.11. Reservoirs and Tanks

Reservoirs or tanks are indicated as an area (polygon) that indicates the location of a pumping station. Enclosed assets are not part of the linear network and can be found on the specific P&ID.

| BLOCK_NAME    | TAG_NAME   | Description   | Default | LU_TABLE_NAME        |
|---------------|------------|---|---------|----------------------|
| PW-Reservoirs | RESVR_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.        | -       | NULL                 |
| PW-Reservoirs | RESVR_NAME | *Reservoir name.  | -       | NULL                 |
| PW-Reservoirs | CAPACITY   | *Maximum storage capacity of the reservoir in cubic metres.   | -       | NULL                 |
| PW-Reservoirs | TYPE       | *Reservoir Type.  | RSVR    | LU_3W_RESERVOIR_TYPE |
| PW-Reservoirs | STATUS     | * Assets Operational Status                                   | INUS    | LU_3W_OP_STATUS      |
| PW-Reservoirs | PID_NO     | *Process/Piping and Instrumentation Drawing Number            | -       | NULL                 |
| PW-Reservoirs | SEISMIC    | *The Seismic Class (A B C D or P) as defined by NZS 3106:2009 | -       | NULL                 |
| PW-Reservoirs | EASTING    | *Easting (X) - Auto populated                                 | -       | NULL                 |
| PW-Reservoirs | NORTHING   | *Northing (Y)- Auto populated                                 | -       | NULL                 |
| PW-Reservoirs | COMMENTS   | Any additional comments that relate to this work extent.      | -       | NULL                 |

## 3. Wastewater (WW) Assets

### 3.1. WW-Pipes

The wastewater collection main used to convey wastewater from one point to another throughout a network by means of pumped pressure or gravity (head pressure). Pipes are the primary asset in each specific network, hence the data captured here is imparted to all connecting assets and equipment.

| BLOCK_NAME | TAG_NAME     | Description  | Default    | LU_TABLE_NAME          |
|------------|--------------|--|------------|------------------------|
| WW-Pipes   | PIPE_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.   | -          | NULL                   |
| WW-Pipes   | LOCATION     | Physical Location of the asset.                          | -          | NULL                   |
| WW-Pipes   | UTILITY      | * Water Service (RW PW WW SW GW)                         | WW         | LU_3W_UTILITY          |
| WW-Pipes   | UTILITY_TYPE | * Water Service Network                                  | WWCO       | LU_3W_UTILITY_TYPE     |
| WW-Pipes   | USAGE        | * Pipe Operational Function                              | GRAV       | LU_3W_PIPE_USE         |
| WW-Pipes   | STATUS       | * Assets Operational Status                              | INUS       | LU_3W_OP_STATUS        |
| WW-Pipes   | UP_AP_NO     | *Upstream Access Point/ Pit/ Node/ Manhole Number.       | -          | NULL                   |
| WW-Pipes   | DN_AP_NO     | *Downstream Access Point / Node Number.                  | -          | NULL                   |
| WW-Pipes   | US_IL        | *Upstream end-of-pipe Invert Level.                      | -          | NULL                   |
| WW-Pipes   | DS_IL        | *Pipe Invert Level at point of discharge.                | -          | NULL                   |
| WW-Pipes   | PIPE_TYPE    | * Pipe Operational Function                              | MAIN       | LU_WWSW_PIPE_TYPE      |
| WW-Pipes   | SHAPE        | * Pipe Shape   | CIRC       | LU_WWSW_PIPE_SHAPE     |
| WW-Pipes   | DIA_WIDTH    | *Pipe Diameter or Width if non-circular.(DN)             | -          | NULL                   |
| WW-Pipes   | WIDTH2       | 2nd pipe diameter when non-circular.                     | -          | NULL                   |
| WW-Pipes   | HEIGHT       | Pipe Height for non-circular pipes.                      | -          | NULL                   |
| WW-Pipes   | INSTL_MTD    | * Pipe installation method.                              | TREN       | LU_3W_PIPEINSTALL      |
| WW-Pipes   | CLASS        | * Pipe Classification (Specification)                    | -          | LU_3W_CLASSIFICATION   |
| WW-Pipes   | COATING      | * Type of External Coating material applied              | NA         | LU_3W_COATING          |
| WW-Pipes   | LINING       | * Type of Internal Lining material applied               | NA         | LU_3W_LINING           |
| WW-Pipes   | MATERIAL     | * Material of Construction                               | -          | LU_3W_MATERIAL         |
| WW-Pipes   | JOINT_TYPE   | * Pipe/Fitting Connection Method                         | -          | LU_3W_PIPE_JOINT_TYPE  |
| WW-Pipes   | GRND_TYPE    | * General Classification of the Ground Material          | -          | LU_3W_GRND_TYPE        |
| WW-Pipes   | BACKFILL     | * Backfill Material                                      | AP40       | LU_3W_BED_BACKFILL_MAT |
| WW-Pipes   | BEDDING      | * Bedding Material                                       | 5_20       | LU_3W_BED_BACKFILL_MAT |
| WW-Pipes   | COMMENTS     | Any additional comments that relate to this work extent. | No Comment | NULL                   |



### 3.2. Service Pipes

Wastewater service connections (or laterals) are the connections from a residential or business user to the wastewater network.

| BLOCK_NAME      | TAG_NAME     | Description   | Default | LU_TABLE_NAME      |
|-----------------|--------------|---|---------|--------------------|
| WW-Service-Pipe | DS_PIPE_NO   | * Downstream WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL               |
| WW-Service-Pipe | LOCATION     | Physical Location of the asset.                                   | -       | NULL               |
| WW-Service-Pipe | LOT_NO       | *Property Address or Lot number.                                  | -       | NULL               |
| WW-Service-Pipe | UTILITY      | * Water Service (RW PW WW SW GW)                                  | WW      | LU_3W_UTILITY      |
| WW-Service-Pipe | UTILITY_TYPE | Water Service Network Type  | SERV    | LU_WWSW_PIPE_TYPE  |
| WW-Service-Pipe | TYPE         | * The Type of Service User  | RESL    | LU_3W_ENDUSER_TYPE |
| WW-Service-Pipe | DIA_WIDTH    | *Pipe Diameter (DN)   | -       | NULL               |
| WW-Service-Pipe | IL           | *Invert level at property end of pipe in metres.                  | -       | NULL               |
| WW-Service-Pipe | STATUS       | * Assets Operational Status                                       | INUS    | LU_3W_OP_STATUS    |
| WW-Service-Pipe | MATERIAL     | * Material of Construction  | -       | LU_3W_MATERIAL     |
| WW-Service-Pipe | COMMENTS     | Any additional comments that relate to this work extent.          | -       | NULL               |

### 3.3. Fittings

Pipeline fittings are items or nodes that facilitate the connectivity of the water network.

| BLOCK_NAME  | TAG_NAME  | Description   | Default | LU_TABLE_NAME      |
|-------------|-----------|---|---------|--------------------|
| WW-Fittings | NODE_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.      | -       | NULL               |
| WW-Fittings | TYPE      | * Fitting Type  | -       | LU_3W_FITTING_TYPE |
| WW-Fittings | STATUS    | * Assets Operational Status                                 | INUS    | LU_3W_OP_STATUS    |
| WW-Fittings | INT_DIAM1 | *Nominal Size of the Pipe Fitting (DN value)                | -       | NULL               |
| WW-Fittings | INT_DIAM2 | *Nominal Size of the Tee Branch or Reduced size (DN value). | -       | NULL               |
| WW-Fittings | MATERIAL  | * Material of Construction                                  | -       | LU_3W_MATERIAL     |
| WW-Fittings | EASTING   | *Easting (X) - Auto populated                               | -       | NULL               |
| WW-Fittings | NORTHING  | *Northing (Y)- Auto populated                               | -       | NULL               |
| WW-Fittings | COMMENTS  | Any additional comments that relate to this work extent.    | -       | NULL               |

### 3.4. Valves

Valves are to control and/or isolate the water flow throughout the network. These are placed at the end of pipeline sections.

| BLOCK_NAME | TAG_NAME      | Description   | Default   | LU_TABLE_NAME       |
|------------|---------------|---|-----------|---------------------|
| WW-Valves  | VALVE_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.      | -         | NULL                |
| WW-Valves  | LOCATION      | Physical Location of the asset.                             | -         | NULL                |
| WW-Valves  | VALVE_TYPE    | * Specific Valve Type                                       | GATE      | LU_WWSW_VALVE_TYPE  |
| WW-Valves  | VALVE_PURPOSE | * Specific Valve Purpose (what it does)                     | ISOLT     | LU_3W_VALVE_PURPOSE |
| WW-Valves  | VALVE_CONTROL | * Valve Actuation   | MANU      | LU_3W_VALVE_CONTROL |
| WW-Valves  | VALVE_STATUS  | * Valve Normal Operation Mode (NO NC LO LC)                 | NO        | LU_3W_VALVE_STATUS  |
| WW-Valves  | VALVE_USE     | * Valve Operational Function                                | GRAV      | LU_3W_VALVE_USE     |
| WW-Valves  | STATUS        | * Assets Operational Status                                 | INUS      | LU_3W_OP_STATUS     |
| WW-Valves  | SIZE          | *Nominal Size of the VALVE (DN value).                      | -         | NULL                |
| WW-Valves  | CLOSE_DIR     | *Close direction of the valve.                              | Clockwise | NULL                |
| WW-Valves  | MANUFACT      | *Manufacturer of the valve.                                 | -         | NULL                |
| WW-Valves  | MATERIAL      | * Material of Construction                                  | ST        | LU_3W_MATERIAL      |
| WW-Valves  | COATING       | Type of External Coating material applied                   | PANT      | LU_3W_COATING       |
| WW-Valves  | TELEMETRY     | *Indicates if the VALVE is connected to a telemetry system. | N         | NULL                |
| WW-Valves  | EASTING       | *Easting (X) - Auto populated                               | -         | NULL                |
| WW-Valves  | NORTHING      | *Northing (Y)- Auto populated                               | -         | NULL                |
| WW-Valves  | COMMENTS      | Any additional comments that relate to this work extent.    | -         | NULL                |

### 3.5. Meters

Meters are items of equipment that are placed at specific locations across the network to measure the volumetric flow from an area or facility.

| BLOCK_NAME | TAG_NAME   | Description  | Default | LU_TABLE_NAME         |
|------------|------------|--|---------|-----------------------|
| WW-Meters  | MTR_NO     | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL                  |
| WW-Meters  | WATER_TYPE | * Water Service (RW PW WW SW GW)                       | WW      | LU_3W_UTILITY         |
| WW-Meters  | LOCATION   | Physical Location of the asset.                        | -       | NULL                  |
| WW-Meters  | LOT_NO     | Property Address or Lot number.                        | -       | NULL                  |
| WW-Meters  | STATUS     | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS       |
| WW-Meters  | METER_TYPE | * The Specific Customer Group being Metered            | DMA     | LU_3W_METER_TYPE      |
| WW-Meters  | MECHANISM  | * The Specific Operational Type of Meter               | -       | LU_3W_METER_MECHANISM |
| WW-Meters  | SERIAL_NO  | *Serial number of the meter.                           | -       | NULL                  |
| WW-Meters  | SIZE       | *Nominal Size of the METER (DN value).                 | -       | NULL                  |
| WW-Meters  | MODEL      | *Model of the meter.                                   | -       | NULL                  |
| WW-Meters  | MANUFACT   | Manufacturer of the asset.                             | -       | NULL                  |

| BLOCK_NAME | TAG_NAME  | Description   | Default | LU_TABLE_NAME  |
|------------|-----------|---|---------|----------------|
| WW-Meters  | MATERIAL  | * Material of Construction                                  | -       | LU_3W_MATERIAL |
| WW-Meters  | TELEMETRY | *Indicates if the meter is connected to a telemetry system. | Y       | NULL           |
| WW-Meters  | EASTING   | *Easting (X) - Auto populated                               | -       | NULL           |
| WW-Meters  | NORTHING  | *Northing (Y)- Auto populated                               | -       | NULL           |
| WW-Meters  | COMMENTS  | Any additional comments that relate to this work extent.    | -       | NULL           |

### 3.6. Traps

A chamber or pit for the purpose of capturing solids and greases (i.e. for disposal other than via the wastewater network).

| BLOCK_NAME | TAG_NAME   | Description  | Default | LU_TABLE_NAME            |
|------------|------------|--|---------|--------------------------|
| WW-Trap    | TRAP_NO    | * WELLINGTON WATER Asset No or Project defined Ref No.               | -       | NULL                     |
| WW-Trap    | LOCATION   | Physical Location of the asset.                                      | -       | NULL                     |
| WW-Trap    | STATUS     | * Assets Operational Status  | INUS    | LU_3W_OP_STATUS          |
| WW-Trap    | TYPE       | * Specific Type and Configuration of Trap                            | TRP02   | LU_WW_TRAP_TYPE          |
| WW-Trap    | LITTER_TRP | *Existence of Litter Traps.  | N       | NULL                     |
| WW-Trap    | LID_TYPE   | * Specific Lid or Cover Material                                     | DI      | LU_3W_ACCPOINT_LID_MATRL |
| WW-Trap    | MATERIAL   | * Material of Construction   | RCON    | LU_3W_MATERIAL           |
| WW-Trap    | FSL        | *Cover Level (m) - Finished Surface Level (FSL) of Trap              | -       | NULL                     |
| WW-Trap    | DEPTH      | *Depth (m) - Finished Surface Level to bottom of Trap                | -       | NULL                     |
| WW-Trap    | DIA_WIDTH  | *Side width of trap or diameter if circular.                         | 600     | NULL                     |
| WW-Trap    | LENGTH     | *Side length of trap if not circular or top length of the wing wall. | -       | NULL                     |
| WW-Trap    | EASTING    | *Easting (X) - Auto populated  | -       | NULL                     |
| WW-Trap    | NORTHING   | *Northing (Y)- Auto populated  | -       | NULL                     |
| WW-Trap    | COMMENTS   | Any additional comments that relate to this work extent.             | -       | NULL                     |

### 3.7. Access Point (chamber/maintenance hole)

A chamber or access point that facilitates the ease of operation or maintenance of the wastewater network.

| BLOCK_NAME       | TAG_NAME | Description  | Default | LU_TABLE_NAME       |
|------------------|----------|--|---------|---------------------|
| WW-Access-Points | AP_NO    | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL                |
| WW-Access-Points | AP_TYPE  | Specific Type of Access Chamber                        | -       | LU_3W_ACCPOINT_TYPE |
| WW-Access-Points | LOCATION | Physical Location of the asset.                        | -       | NULL                |
| WW-Access-Points | STATUS   | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS     |

| BLOCK_NAME       | TAG_NAME     | Description   | Default | LU_TABLE_NAME            |
|------------------|--------------|---|---------|--------------------------|
| WW-Access-Points | FSL          | *Cover Level (m) - Finished Surface Level of Access Point | -       | NULL                     |
| WW-Access-Points | ACCES_DIAM   | *The width (mm) of the entrance to the Access Point.      | 1200    | NULL                     |
| WW-Access-Points | DIA_WIDTH    | *Diameter or Side width of Access Point / Chamber. (mm)   | 1200    | NULL                     |
| WW-Access-Points | LENGTH       | Side length of access point if non-circular               | -       | NULL                     |
| WW-Access-Points | DEPTH        | *Depth (m) - FSL to bottom of Access Point                | -       | NULL                     |
| WW-Access-Points | NO_DROPS     | *Number of drops  | -       | NULL                     |
| WW-Access-Points | BENCHED      | *Indicates if the access point is benched (Y or N)        | -       | NULL                     |
| WW-Access-Points | COVER_MAT    | * Specific Lid or Cover Material                          | DI      | LU_3W_ACCPOINT_LID_MATRL |
| WW-Access-Points | COVER_HINGED | Cover Hinged (Y or N)                                     | N       |                          |
| WW-Access-Points | COVER_TYPE   | Solid or Grate  | Solid   |                          |
| WW-Access-Points | SCREEN       | *Screen Installed (Y or N)                                | N       | NULL                     |
| WW-Access-Points | VENT         | *If a vent is connected or not                            | N       | NULL                     |
| WW-Access-Points | VENT_H       | Height of the vent in millimetres                         | -       | NULL                     |
| WW-Access-Points | WALL_MAT     | * Material of Construction                                | RCON    | LU_3W_MATERIAL           |
| WW-Access-Points | FRAME_MAT    | * Material of Construction                                | -       | LU_3W_MATERIAL           |
| WW-Access-Points | EASTING      | *Easting (X) - Auto populated                             | -       | NULL                     |
| WW-Access-Points | NORTHING     | *Northing (Y)- Auto populated                             | -       | NULL                     |
| WW-Access-Points | COMMENTS     | Any additional comments that relate to this work extent.  | -       | NULL                     |

### 3.8. Conduit Access Point (service chamber)

A chamber that contains non-water services, e.g. electrical or instrument cables, service water (flush lines), compressed air pipelines.

| BLOCK_NAME               | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|--------------------------|-----------|--|---------|-----------------|
| WW-Conduit-Access-Points | CON_AC_NO | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL            |
| WW-Conduit-Access-Points | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| WW-Conduit-Access-Points | DIA_WIDTH | Diameter or Side width of Access Point / Chamber. (mm)   | 900     | NULL            |
| WW-Conduit-Access-Points | DEPTH     | Depth (m) - FSL to bottom of Access Point                | -       | NULL            |
| WW-Conduit-Access-Points | MATERIAL  | Material of Construction                                 | RCON    | LU_3W_MATERIAL  |
| WW-Conduit-Access-Points | EASTING   | *Easting (X) - Auto populated                            | -       | NULL            |
| WW-Conduit-Access-Points | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL            |
| WW-Conduit-Access-Points | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL            |

### 3.9. Conduit Pipe

The piping duct to and from the asset and the conduit access point.

| BLOCK_NAME  | TAG_NAME   | Description  | Default | LU_TABLE_NAME   |
|-------------|------------|--|---------|-----------------|
| WW-Conduits | CONDUIT_NO | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL            |
| WW-Conduits | STATUS     | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| WW-Conduits | SIZE       | *Nominal Size of the PIPE (DN value).                    | -       | NULL            |
| WW-Conduits | MATERIAL   | * Material of Construction                               | uPVC    | LU_3W_MATERIAL  |
| WW-Conduits | ST_PIT_NO  | *Ref No. of the Start Point of Conduit access point.     | -       | NULL            |
| WW-Conduits | EN_PIT_NO  | *Ref No. of the End Point of Conduit access point.       | -       | NULL            |
| WW-Conduits | LENGTH     | *Conduit section length in metres.                       | -       | NULL            |
| WW-Conduits | COMMENTS   | Any additional comments that relate to this work extent. | -       | NULL            |

### 3.10. Pump Station

Pump stations are indicated as an area (polygon) that indicate the location of a pumping station. Enclosed assets are not part of the linear network and can be found on the specific P&ID.

| BLOCK_NAME       | TAG_NAME  | Description   | Default | LU_TABLE_NAME   |
|------------------|-----------|---|---------|-----------------|
| WW-Pump-Stations | WWPS_NO   | *Pump Station Number.                                   | -       | NULL            |
| WW-Pump-Stations | WWPS_NAME | *Wastewater Pump Station Name.                          | -       | NULL            |
| WW-Pump-Stations | NO_PUMPS  | *Number of Pumps.                                       | -       | NULL            |
| WW-Pump-Stations | STATUS    | * Assets Operational Status                             | INUS    | LU_3W_OP_STATUS |
| WW-Pump-Stations | PID_NO    | *Process/Piping and Instrumentation Drawing Number      | -       | NULL            |
| WW-Pump-Stations | EASTING   | *Easting (X) - Auto populated                           | -       | NULL            |
| WW-Pump-Stations | NORTHING  | *Northing (Y)- Auto populated                           | -       | NULL            |
| WW-Pump-Stations | COMMENTS  | Any additional comments that relate to this work extent | -       | NULL            |

### 3.11. Network Structures

Wastewater miscellaneous structures operation feature. Shown as an area polygon.

| BLOCK_NAME                | TAG_NAME | Description                  | Default | LU_TABLE_NAME   |
|---------------------------|----------|------------------------------|---------|-----------------|
| WW-Other-Network-Structrs | TYPE     | *Feature type.               | -       | NULL            |
| WW-Other-Network-Structrs | STATUS   | * Assets Operational Status  | INUS    | LU_3W_OP_STATUS |
| WW-Other-Network-Structrs | T_WL     | *Top level of the system. MM | -       | NULL            |

| BLOCK_NAME                | TAG_NAME | Description  | Default | LU_TABLE_NAME |
|---------------------------|----------|--|---------|---------------|
| WW-Other-Network-Structrs | BASE_RL  | *Level at the base of the system.                        | -       | NULL          |
| WW-Other-Network-Structrs | COMMENTS | Any additional comments that relate to this work extent. | -       | NULL          |

## 4. Stormwater (SW) Assets

### 4.1. SW-Pipes and Culverts

The Stormwater collection main used to convey stormwater from one point to another throughout a network, by means of pumped pressure or gravity (head pressure). Pipes are the primary asset in each specific network, hence the data captured here is imparted to all connecting assets and equipment.

| BLOCK_NAME | TAG_NAME     | Description  | Default | LU_TABLE_NAME         |
|------------|--------------|--|---------|-----------------------|
| SW-Pipes   | PIPE_NO      | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL                  |
| SW-Pipes   | LOCATION     | Physical Location of the asset.                        | -       | NULL                  |
| SW-Pipes   | UTILITY      | * Water Service (RW PW WW SW GW)                       | SW      | LU_3W_UTILITY         |
| SW-Pipes   | UTILITY_TYPE | * Water Service Network                                | SWCO    | LU_3W_UTILITY_TYPE    |
| SW-Pipes   | USAGE        | * Pipe Operational Function                            | GRAV    | LU_3W_PIPE_USE        |
| SW-Pipes   | STATUS       | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS       |
| SW-Pipes   | UP_AP_NO     | *Upstream Access Point / Node Number.                  | -       | NULL                  |
| SW-Pipes   | DN_AP_NO     | *Downstream Access Point / Node Number.                | -       | NULL                  |
| SW-Pipes   | US_IL        | *Upstream end-of-pipe Invert Level.                    | -       | NULL                  |
| SW-Pipes   | DS_IL        | *Pipe Invert Level at point of discharge.              | -       | NULL                  |
| SW-Pipes   | PIPE_TYPE    | * Pipe Operational Function                            | MAIN    | LU_WWSW_PIPE_TYPE     |
| SW-Pipes   | SHAPE        | * Pipe Shape   | CIRC    | LU_WWSW_PIPE_SHAPE    |
| SW-Pipes   | CULVERT_TYPE | * Culvert Type and Shape                               | PIPE    | LU_WWSW_CULVERT_TYPE  |
| SW-Pipes   | DIA_WIDTH    | *Pipe Diameter or Width if non-circular.               | -       | NULL                  |
| SW-Pipes   | WIDTH2       | 2nd pipe diameter when non-circular.                   | -       | NULL                  |
| SW-Pipes   | HEIGHT       | Pipe Height for non-circular pipes.                    | -       | NULL                  |
| SW-Pipes   | INSTL_MTD    | * Pipe installation method.                            | TREN    | LU_3W_PIPEINSTALL     |
| SW-Pipes   | CLASS        | * Pipe Classification (Specification)                  | -       | LU_3W_CLASSIFICATION  |
| SW-Pipes   | COATING      | Type of External Coating material applied              | NA      | LU_3W_COATING         |
| SW-Pipes   | LINING       | * Type of Internal Lining material applied             | NA      | LU_3W_LINING          |
| SW-Pipes   | MATERIAL     | * Material of Construction                             | -       | LU_3W_MATERIAL        |
| SW-Pipes   | JOINT_TYPE   | * Pipe/Fitting Connection Method                       | -       | LU_3W_PIPE_JOINT_TYPE |

| BLOCK_NAME | TAG_NAME  | Description  | Default    | LU_TABLE_NAME          |
|------------|-----------|--|------------|------------------------|
| SW-Pipes   | GRND_TYPE | * General Classification of the Ground Material          | -          | LU_3W_GRND_TYPE        |
| SW-Pipes   | BACKFILL  | * Backfill Material                                      | AP40       | LU_3W_BED_BACKFILL_MAT |
| SW-Pipes   | BEDDING   | * Bedding Material                                       | 5_20       | LU_3W_BED_BACKFILL_MAT |
| SW-Pipes   | COMMENTS  | Any additional comments that relate to this work extent. | No Comment | NULL                   |

#### 4.2. Service Pipe/Connections

Stormwater service connections (or laterals) are the connection from the residential or business user to the stormwater network

| BLOCK_NAME      | TAG_NAME   | Description   | Default | LU_TABLE_NAME      |
|-----------------|------------|---|---------|--------------------|
| SW-Service-Pipe | DS_PIPE_NO | * Downstream WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL               |
| SW-Service-Pipe | LOCATION   | Physical Location of the asset.                                   | -       | NULL               |
| SW-Service-Pipe | LOT_NO     | *Property Address or Lot number.                                  | -       | NULL               |
| SW-Service-Pipe | WATER_TYPE | * Water Service (RW PW WW SW GW)                                  | SW      | LU_3W_UTILITY      |
| SW-Service-Pipe | PIPE_TYPE  | * Pipe Operational Function                                       | SERV    | LU_WWSW_PIPE_TYPE  |
| SW-Service-Pipe | TYPE       | * The Type of Service User  | RESL    | LU_3W_ENDUSER_TYPE |
| SW-Service-Pipe | DIA_WIDTH  | *Pipe Diameter (DN)   | 100     | NULL               |
| SW-Service-Pipe | IL         | *Invert level at property end of pipe in metres.                  | -       | NULL               |
| SW-Service-Pipe | STATUS     | * Assets Operational Status                                       | INUS    | LU_3W_OP_STATUS    |
| SW-Service-Pipe | MATERIAL   | * Material of Construction  | -       | LU_3W_MATERIAL     |
| SW-Service-Pipe | COMMENTS   | Any additional comments that relate to this work extent.          | -       | NULL               |

#### 4.3. Channel

Stormwater open natural channels or gullies, kerbs, swales, streams and rivers that facilitate the natural water flow.

| BLOCK_NAME | TAG_NAME     | Description  | Default | LU_TABLE_NAME      |
|------------|--------------|--|---------|--------------------|
| SW-Channel | CHANNEL_NO   | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL               |
| SW-Channel | LOCATION     | Physical Location of the asset.                        | -       | NULL               |
| SW-Channel | TYPE         | * Type of Open Channel to Discharge                    | OCHN    | LU_SW_CHANNEL      |
| SW-Channel | UTILITY      | * Water Service (RW PW WW SW GW)                       | SW      | LU_3W_UTILITY      |
| SW-Channel | UTILITY_TYPE | * Water Service Network                                | SWCO    | LU_3W_UTILITY_TYPE |
| SW-Channel | USAGE        | * Pipe Operational Function                            | GRAV    | LU_3W_PIPE_USE     |
| SW-Channel | STATUS       | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS    |

| BLOCK_NAME | TAG_NAME  | Description  | Default | LU_TABLE_NAME       |
|------------|-----------|--|---------|---------------------|
| SW-Channel | UP_AP_NO  | *Upstream Access Point / Node Number.                    | -       | NULL                |
| SW-Channel | DN_AP_NO  | *Downstream Access Point / Node Number.                  | -       | NULL                |
| SW-Channel | US_IL     | *Upstream end-of-channel Invert Level.                   | -       | NULL                |
| SW-Channel | DS_IL     | *Downstream end-of-channel Invert Level.                 | -       | NULL                |
| SW-Channel | SHAPE     | * Open Channel Shape                                     | TRPZ    | LU_SW_CHANNEL_SHAPE |
| SW-Channel | HEIGHT    | *Channel Height.   | -       | NULL                |
| SW-Channel | DIA_WIDTH | *Channel Width (average)                                 | -       | NULL                |
| SW-Channel | LINING    | * Type of Internal Lining material applied               | NA      | LU_3W_LINING        |
| SW-Channel | MATERIAL  | * Material of Construction                               | -       | LU_3W_MATERIAL      |
| SW-Channel | GRND_TYPE | * General Classification of the Ground Material          | -       | LU_3W_GRND_TYPE     |
| SW-Channel | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL                |

#### 4.4. Valves

Valves are to control and/or isolate the water flow throughout the network. These are placed at the end of pipeline sections.

| BLOCK_NAME | TAG_NAME      | Description   | Default   | LU_TABLE_NAME       |
|------------|---------------|---|-----------|---------------------|
| SW-Valves  | VALVE_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.      | -         | NULL                |
| SW-Valves  | LOCATION      | Physical Location of the asset.                             | -         | NULL                |
| SW-Valves  | VALVE_TYPE    | * Specific Valve Type                                       | GATE      | LU_WWSW_VALVE_TYPE  |
| SW-Valves  | VALVE_PURPOSE | * Specific Valve Purpose (what it does)                     | ISOLT     | LU_3W_VALVE_PURPOSE |
| SW-Valves  | VALVE_CONTROL | * Valve Actuation   | MANU      | LU_3W_VALVE_CONTROL |
| SW-Valves  | VALVE_STATUS  | * Valve Normal Operation Mode (NO NC LO LC)                 | NO        | LU_3W_VALVE_STATUS  |
| SW-Valves  | VALVE_USE     | * Valve Operational Function                                | GRAV      | LU_3W_VALVE_USE     |
| SW-Valves  | STATUS        | * Assets Operational Status                                 | INUS      | LU_3W_OP_STATUS     |
| SW-Valves  | SIZE          | *Nominal Size of the VALVE (DN value).                      | -         | NULL                |
| SW-Valves  | CLOSE_DIR     | *Close direction of the valve.                              | Clockwise | NULL                |
| SW-Valves  | MANUFACT      | *Manufacturer of the valve.                                 | -         | NULL                |
| SW-Valves  | MATERIAL      | * Material of Construction                                  | ST        | LU_3W_MATERIAL      |
| SW-Valves  | COATING       | Type of External Coating material applied                   | PANT      | LU_3W_COATING       |
| SW-Valves  | TELEMETRY     | *Indicates if the VALVE is connected to a telemetry system. | N         | NULL                |
| SW-Valves  | EASTING       | *Easting (X) - Auto populated                               | -         | NULL                |
| SW-Valves  | NORTHING      | *Northing (Y)- Auto populated                               | -         | NULL                |
| SW-Valves  | COMMENTS      | Any additional comments that relate to this work extent.    | -         | NULL                |



#### 4.5. Fittings

Pipeline fittings are items or nodes that facilitate the connectivity of the water network.

| BLOCK_NAME  | TAG_NAME  | Description   | Default | LU_TABLE_NAME      |
|-------------|-----------|---|---------|--------------------|
| SW-Fittings | NODE_NO   | * WELLINGTON WATER Asset No or Project defined Ref No.      | -       | NULL               |
| SW-Fittings | TYPE      | * Fitting Type  | -       | LU_3W_FITTING_TYPE |
| SW-Fittings | STATUS    | * Assets Operational Status                                 | INUS    | LU_3W_OP_STATUS    |
| SW-Fittings | INT_DIAM1 | *Nominal Size of the Pipe Fitting (DN value)                | -       | NULL               |
| SW-Fittings | INT_DIAM2 | *Nominal Size of the Tee Branch or Reduced size (DN value). | -       | NULL               |
| SW-Fittings | MATERIAL  | * Material of Construction                                  | -       | LU_3W_MATERIAL     |
| SW-Fittings | EASTING   | *Easting (X) - Auto populated                               | -       | NULL               |
| SW-Fittings | NORTHING  | *Northing (Y)- Auto populated                               | -       | NULL               |
| SW-Fittings | COMMENTS  | Any additional comments that relate to this work extent.    | -       | NULL               |

#### 4.6. Meters

Meters are items of equipment that are placed at specific locations across the network to measure the volumetric flow to an area or facility.

| BLOCK_NAME | TAG_NAME   | Description   | Default | LU_TABLE_NAME         |
|------------|------------|---|---------|-----------------------|
| SW-Meters  | MTR_NO     | * WELLINGTON WATER Asset No or Project defined Ref No.      | -       | NULL                  |
| SW-Meters  | WATER_TYPE | * Water Service (RW PW WW SW GW)                            | SW      | LU_3W_UTILITY         |
| SW-Meters  | LOCATION   | Physical Location of the asset.                             | -       | NULL                  |
| SW-Meters  | LOT_NO     | Property Address or Lot number.                             | -       | NULL                  |
| SW-Meters  | STATUS     | * Assets Operational Status                                 | INUS    | LU_3W_OP_STATUS       |
| SW-Meters  | METER_TYPE | * The Specific Customer Group being Metered                 | DMA     | LU_3W_METER_TYPE      |
| SW-Meters  | MECHANISM  | * The Specific Operational Type of Meter                    | -       | LU_3W_METER_MECHANISM |
| SW-Meters  | SERIAL_NO  | *Serial number of the meter.                                | -       | NULL                  |
| SW-Meters  | SIZE       | *Nominal Size of the METER (DN value).                      | -       | NULL                  |
| SW-Meters  | MODEL      | *Model of the meter.  | -       | NULL                  |
| SW-Meters  | MANUFACT   | Manufacturer of the asset.                                  | -       | NULL                  |
| SW-Meters  | MATERIAL   | * Material of Construction                                  | -       | LU_3W_MATERIAL        |
| SW-Meters  | TELEMETRY  | *Indicates if the meter is connected to a telemetry system. | Y       | NULL                  |
| SW-Meters  | EASTING    | *Easting (X) - Auto populated                               | -       | NULL                  |
| SW-Meters  | NORTHING   | *Northing (Y)- Auto populated                               | -       | NULL                  |
| SW-Meters  | COMMENTS   | Any additional comments that relate to this work extent.    | -       | NULL                  |

#### 4.7. Sumps

Kerb-side or open area collection chamber with inlet to the stormwater network. Also known as a catchpit.

| BLOCK_NAME | TAG_NAME   | Description  | Default | LU_TABLE_NAME            |
|------------|------------|--|---------|--------------------------|
| SW-Sumps   | SUMP_NO    | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL                     |
| SW-Sumps   | LOCATION   | Physical Location of the asset.                          | -       | NULL                     |
| SW-Sumps   | STATUS     | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS          |
| SW-Sumps   | TYPE       | * Specific Type and Configuration of Sump                | -       | LU_SW_SUMP_TYPE          |
| SW-Sumps   | LITTER_TRP | *Existence of Litter Traps.                              | N       | NULL                     |
| SW-Sumps   | LID_TYPE   | * Specific Lid or Cover Material                         | DI      | LU_3W_ACCPOINT_LID_MATRL |
| SW-Sumps   | MATERIAL   | * Material of Construction                               | RCON    | LU_3W_MATERIAL           |
| SW-Sumps   | FSL        | *Cover Level (m) - Finished Surface Level (FSL) of Sump  | -       | NULL                     |
| SW-Sumps   | DEPTH      | *Depth (m) - Finished Surface Level to bottom of Sump    | -       | NULL                     |
| SW-Sumps   | DIA_WIDTH  | *Side width of Sump or diameter if circular.             | 600     | NULL                     |
| SW-Sumps   | LENGTH     | *Side length of Sump if not circular or length.          | -       | NULL                     |
| SW-Sumps   | EASTING    | *Easting (X) - Auto populated                            | -       | NULL                     |
| SW-Sumps   | NORTHING   | *Northing (Y)- Auto populated                            | -       | NULL                     |
| SW-Sumps   | COMMENTS   | Any additional comments that relate to this work extent. | -       | NULL                     |

#### 4.8. Access Point (chamber/maintenance hole)

A chamber or access point that facilitates the ease of operation or maintenance of the stormwater network.

| BLOCK_NAME       | TAG_NAME   | Description   | Default | LU_TABLE_NAME       |
|------------------|------------|---|---------|---------------------|
| SW-Access-Points | AP_NO      | * WELLINGTON WATER Asset No or Project defined Ref No.              | -       | NULL                |
| SW-Access-Points | AP_TYPE    | Specific Type of Access Chamber                                     | -       | LU_3W_ACCPOINT_TYPE |
| SW-Access-Points | LOCATION   | Physical Location of the asset.                                     | -       | NULL                |
| SW-Access-Points | STATUS     | * Assets Operational Status   | INUS    | LU_3W_OP_STATUS     |
| SW-Access-Points | FSL        | *Cover Level (m) - Finished Surface Level of Access Point / Chamber | -       | NULL                |
| SW-Access-Points | ACCES_DIAM | *The width (mm) of the entrance to the Access Point.                | 1200    | NULL                |
| SW-Access-Points | DIA_WIDTH  | *Diameter or Side width of Access Point / Chamber. (mm)             | 1200    | NULL                |
| SW-Access-Points | LENGTH     | Side length of access point if non-circular                         | -       | NULL                |
| SW-Access-Points | DEPTH      | *Depth (m) - FSL to bottom of Access Point                          | -       | NULL                |
| SW-Access-Points | NO_DROPS   | *Number of drops  | -       | NULL                |

| BLOCK_NAME       | TAG_NAME     | Description  | Default | LU_TABLE_NAME            |
|------------------|--------------|--|---------|--------------------------|
| SW-Access-Points | BENCHED      | *Indicates if the access point is benched (Y or N)       | -       | NULL                     |
| SW-Access-Points | COVER_MAT    | * Specific Lid or Cover Material                         | DI      | LU_3W_ACCPOINT_LID_MATRL |
| SW-Access-Points | COVER_HINGED | Cover Hinged (Y or N)                                    | N       |                          |
| SW-Access-Points | COVER_TYPE   | Solid or Grate   | Solid   |                          |
| SW-Access-Points | SCREEN       | *Screen Installed (Y or N)                               | N       | NULL                     |
| SW-Access-Points | VENT         | *If a vent is connected or not                           | N       | NULL                     |
| SW-Access-Points | VENT_H       | Height of the vent in metres                             | 1       | NULL                     |
| SW-Access-Points | WALL_MAT     | * Material of Construction                               | RCON    | LU_3W_MATERIAL           |
| SW-Access-Points | FRAME_MAT    | * Material of Construction                               | -       | LU_3W_MATERIAL           |
| SW-Access-Points | EASTING      | *Easting (X) - Auto populated                            | -       | NULL                     |
| SW-Access-Points | NORTHING     | *Northing (Y)- Auto populated                            | -       | NULL                     |
| SW-Access-Points | COMMENTS     | Any additional comments that relate to this work extent. | -       | NULL                     |

#### 4.9. Conduit Access Point (service chamber)

A chamber that contains non-water services, e.g. electrical or instrument cables, service water (flush lines), compressed air pipelines.

| BLOCK_NAME               | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|--------------------------|-----------|--|---------|-----------------|
| SW-Conduit-Access-Points | CON_AC_NO | * WELLINGTON WATER Asset No or Project defined Ref No.   | -       | NULL            |
| SW-Conduit-Access-Points | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| SW-Conduit-Access-Points | DIA_WIDTH | Diameter or Side width of Access Point / Chamber. (mm)   | 900     | NULL            |
| SW-Conduit-Access-Points | DEPTH     | Depth (m) - FSL to bottom of Access Point                | -       | NULL            |
| SW-Conduit-Access-Points | MATERIAL  | Material of Construction                                 | RCON    | LU_3W_MATERIAL  |
| SW-Conduit-Access-Points | EASTING   | *Easting (X) - Auto populated                            | -       | NULL            |
| SW-Conduit-Access-Points | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL            |
| SW-Conduit-Access-Points | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL            |

#### 4.10. Conduit Pipe

The piping service duct to and from the asset, and the conduit access point.

| BLOCK_NAME  | TAG_NAME   | Description  | Default | LU_TABLE_NAME   |
|-------------|------------|--|---------|-----------------|
| SW-Conduits | CONDUIT_NO | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL            |
| SW-Conduits | STATUS     | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS |
| SW-Conduits | SIZE       | *Nominal Size of the PIPE (DN value).                  | -       | NULL            |

| BLOCK_NAME  | TAG_NAME  | Description  | Default | LU_TABLE_NAME  |
|-------------|-----------|--|---------|----------------|
| SW-Conduits | MATERIAL  | * Material of Construction                               | uPVC    | LU_3W_MATERIAL |
| SW-Conduits | ST_PIT_NO | *Ref No. of the Start Point of Conduit access point.     | -       | NULL           |
| SW-Conduits | EN_PIT_NO | *Ref No. of the End Point of Conduit access point.       | -       | NULL           |
| SW-Conduits | LENGTH    | *Conduit section length in metres.                       | -       | NULL           |
| SW-Conduits | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL           |

#### 4.11. Pump Station

Pump Stations are indicated as an area (polygon) that indicates the location of a pumping station. Enclosed assets are not part of the linear network and can be found on the specific P&ID.

| BLOCK_NAME  | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|-------------|-----------|--|---------|-----------------|
| SW-Conduits | SWPS_NO   | *SW Pump Station Number.                                 | -       | NULL            |
| SW-Conduits | SWPS_NAME | *Stormwater Pump Station Name.                           | -       | NULL            |
| SW-Conduits | PID_NO    | *Process/Piping and Instrumentation Drawing Number       | -       | NULL            |
| SW-Conduits | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| SW-Conduits | EASTING   | *Easting (X) - Auto populated                            | -       | NULL            |
| SW-Conduits | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL            |
| SW-Conduits | NO_PUMPS  | *Number of Pumps.  | -       | NULL            |
| SW-Conduits | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL            |

#### 4.12. Head End Walls

Also known as Headwalls or Wing Walls. These structures are constructed at the end of an outfall of a drain or culvert to serve as a retaining wall and scour protection. They are indicated as an area (polygon) with the following attributes.

| BLOCK_NAME        | TAG_NAME | Description  | Default | LU_TABLE_NAME   |
|-------------------|----------|--|---------|-----------------|
| SW-Head-End-Walls | STRUC_NO | * WELLINGTON WATER Asset No or Project defined Ref No. | -       | NULL            |
| SW-Head-End-Walls | LOCATION | Physical Location of the asset.                        | -       | NULL            |
| SW-Head-End-Walls | MATERIAL | * Material of Construction                             | -       | LU_3W_MATERIAL  |
| SW-Head-End-Walls | STATUS   | * Assets Operational Status                            | INUS    | LU_3W_OP_STATUS |
| SW-Head-End-Walls | HEIGHT_1 | *Height of head/endwall.                               | -       | NULL            |
| SW-Head-End-Walls | HEIGHT_2 | *Front height of wingwall.                             | -       | NULL            |
| SW-Head-End-Walls | LENGTH_1 | *Top length of the wing wall.                          | -       | NULL            |
| SW-Head-End-Walls | LENGTH_2 | *Bottom length of the wing wall.                       | -       | NULL            |

| BLOCK_NAME        | TAG_NAME   | Description  | Default | LU_TABLE_NAME |
|-------------------|------------|--|---------|---------------|
| SW-Head-End-Walls | LITTER_TRP | *Existence of Litter Traps.                              | N       | NULL          |
| SW-Head-End-Walls | THICKNESS1 | *Thickness of head/end wall                              | -       | NULL          |
| SW-Head-End-Walls | THICKNESS2 | *Thickness of the wing wall.                             | -       | NULL          |
| SW-Head-End-Walls | THICKNESS3 | *Thickness of the apron.                                 | -       | NULL          |
| SW-Head-End-Walls | WIDTH1     | *Width of head/endwall.                                  | -       | NULL          |
| SW-Head-End-Walls | WIDTH2     | *Width of apron  | -       | NULL          |
| SW-Head-End-Walls | EASTING    | *Easting (X) - Auto populated                            | -       | NULL          |
| SW-Head-End-Walls | NORTHING   | *Northing (Y)- Auto populated                            | -       | NULL          |
| SW-Head-End-Walls | COMMENTS   | Any additional comments that relate to this work extent. | -       | NULL          |

#### 4.13. Treatment Devices

Stormwater Treatment Devices are a structures designed to reduce stormwater run-off volume and contamination. They are indicated as an area (polygon) with the following attributes.

| BLOCK_NAME          | TAG_NAME  | Description  | Default | LU_TABLE_NAME   |
|---------------------|-----------|--|---------|-----------------|
| SW-Treatment Device | SWTD_NO   | * SW Treatment Device Number.                            | -       | NULL            |
| SW-Treatment Device | SWTD_NAME | * SW Treatment Device Name.                              | -       | NULL            |
| SW-Treatment Device | STATUS    | * Assets Operational Status                              | INUS    | LU_3W_OP_STATUS |
| SW-Treatment Device | EASTING   | *Easting (X) - Auto populated                            | -       | NULL            |
| SW-Treatment Device | NORTHING  | *Northing (Y)- Auto populated                            | -       | NULL            |
| SW-Treatment Device | TYPE      | * Treatment Device Type                                  | WETL    | LU_SW_DEVICE    |
| SW-Treatment Device | COMMENTS  | Any additional comments that relate to this work extent. | -       | NULL            |

## 5. Code List / Look Up Tables

For assets that can be specified for all three water systems, they have been grouped in the following tables under the individual three water assets (SW, WW, PW).

| APPDX | LU_CODE                  | DESCRIPTION                                   |
|-------|--------------------------|---|
| 5.1   | LU_3W_OWNER              | Council or Authority Asset Owner              |
| 5.2   | LU_3W_OP_STATUS          | Assets Operational Status                     |
| 5.3   | LU_3W_UTILITY            | Water Service (RW PW WW SW GW)                |
| 5.4   | LU_3W_UTILITY_TYPE       | Water Service Network                         |
| 5.5   | LU_3W_ENDUSER_TYPE       | Type of Service User                          |
| 5.6   | LU_PW_PIPE_TYPE          | Operational Function of the Pipe              |
| 5.7   | LU_WWSW_PIPE_TYPE        | Operational Function of the Pipe              |
| 5.8   | LU_3W_CLASSIFICATION     | Pipe Classification (Specification)           |
| 5.9   | LU_3W_PIPE_USE           | Operational Conditions of the Pipe            |
| 5.1   | LU_3W_PIPE_JOINT_TYPE    | Pipe/Fitting Connection Method                |
| 5.11  | LU_3W_PIPEINSTALL        | Pipe installation method.                     |
| 5.12  | LU_WWSW_PIPE_SHAPE       | Pipes Shape                                   |
| 5.13  | LU_WWSW_CULVERT_TYPE     | Culvert Type and Shape                        |
| 5.14  | LU_PW_VALVE_TYPE         | Specific Valve Type                           |
| 5.15  | LU_PW_HYDRANT_TYPE       | Hydrant Type                                  |
| 5.16  | LU_WWSW_VALVE_TYPE       | Specific Valve Type                           |
| 5.17  | LU_3W_VALVE_CONTROL      | Valve Actuation                               |
| 5.18  | LU_3W_VALVE_PURPOSE      | Specific Valve Purpose (what it does)         |
| 5.19  | LU_3W_VALVE_STATUS       | Valve Normal Operation Mode (NO NC LO LC)     |
| 5.2   | LU_3W_VALVE_USE          | Valve Operational Function                    |
| 5.21  | LU_3W_FITTING_TYPE       | Fitting or Node Type                          |
| 5.22  | LU_3W_METER_TYPE         | Specific Customer Group being metered         |
| 5.23  | LU_3W_METER_MECHANISM    | Specific Operational Type of Meter            |
| 5.24  | LU_3W_ACCPOINT_TYPE      | Specific Type of Access Chamber               |
| 5.25  | LU_3W_ACCPOINT_LID_MATRL | Specific Lid or Cover Material                |
| 5.26  | LU_SW_DEVICE             | Stormwater Treatment Device                   |
| 5.27  | LU_SW_CHANNEL            | Type of Open Channel to Discharge             |
| 5.28  | LU_SW_CHANNEL_SHAPE      | Open Channel Shape                            |
| 5.29  | LU_SW_SUMP_TYPE          | Specific Type and Configuration of Sump       |
| 5.3   | LU_WW_TRAP_TYPE          | Specific Type and Configuration of Trap       |
| 5.31  | LU_3W_MATERIAL           | Material of Construction                      |
| 5.32  | LU_3W_COATING            | Type of External Coating material applied     |
| 5.33  | LU_3W_LINING             | Type of Internal Lining material applied      |
| 5.34  | LU_3W_GRND_TYPE          | General Classification of the Ground Material |
| 5.35  | LU_3W_BED_BACKFILL_MAT   | Bedding and Backfill Material                 |
| 5.36  | LU_3W_RESERVIOR_TYPEB    | Types of Water Reservoirs                     |
| 5.37  | LU_PW_BFP_TYPE           | Water Supply Backflow Pressure Preventer type |
| 5.38  | LU_PW_BFP_PREVENT_TYPE   | Backflow Preventer Type                       |
| 5.39  | LU_PW_BFP_HAZARD         | Hazard Level Classification                   |
| 5.40  | LU_PW_BFP_BUSACT         | Business Activity classification              |
| 5.41  | BFP Codes                | Hazard type Classification                    |

### 5.1. LU\_3W\_OWNER

Specific Council or authority asset owner.

| LU_CODE | LU_VALUE              |
|---------|-----------------------|
| GWRC    | Greater Wellington RC |

| LU_CODE  | LU_VALUE                          |
|----------|-----------------------------------|
| HCC      | Hutt City C                       |
| UHCC     | Upper Hutt CC                     |
| PCC      | Porirua CC                        |
| WCC      | Wellington CC                     |
| SWDC     | South Wairarapa DC                |
| PVT      | Privately Owned                   |
| NZTA     | NZ Transport Authority            |
| CCDHB    | Capital Coast DHB                 |
| HVDHB    | Hutt Valley District Health Board |
| WIAL     | Wellington Intl Airport Ltd       |
| CNTRPORT | Centreport                        |
| KIWIRAIL | KiwiRail                          |
| TPWR     | Transpower                        |
| NZDF     | New Zealand Defence Force         |
| DCOR     | Department of Corrections         |
| NZDF     | New Zealand Defence Force         |

## 5.2. LU\_3W\_OP\_STATUS

The operation status of the three water piping systems.

| LU_CODE | LU_VALUE                                   |
|---------|--|
| INUS    | In use                                     |
| AOOS    | Active - Out of Service                    |
| STBY    | Active - Standby                           |
| STOK    | Active - Stock                             |
| REMO    | Removed                                    |
| REPU    | Active – Repurposed (DUCT)                 |
| ABAN    | Abandoned                                  |
| SPAR    | Decom - Spares                             |
| VIRT    | Virtual connection (Used for connectivity) |
| EROR    | Error during Data Entry                    |

## 5.3. LU\_3W\_UTILITY

The specific water system management code for operation, maintenance and valuation purposes.

| LU_CODE | LU_VALUE                     |
|---------|------------------------------|
| RW      | Raw Water                    |
| PW      | Water Supply / Potable Water |
| WW      | Wastewater                   |
| SW      | Stormwater                   |

## 5.4. LU\_3W\_UTILITY\_TYPE

The specific subset for the water system management code for operation, maintenance and valuation purposes.

| LU_CODE | LU_VALUE                                  |
|---------|---|
| RWST    | Raw Water Storage                         |
| RWTN    | Raw Water Transfer                        |
| PWTP    | Potable / Water Supply Treatment          |
| PWST    | Potable / Water Supply Storage            |
| PWTM    | Potable / Water Supply Transmission       |
| PWSC    | Potable / Water Supply Service Connection |

| LU_CODE | LU_VALUE                            |
|---------|-------------------------------------|
| PWDB    | Potable / Water Supply Distribution |
| WWCO    | Wastewater Collection               |
| WWTP    | Wastewater Treatment                |
| WWST    | Wastewater Storage                  |
| WWSC    | Wastewater Service Connection       |
| SWCO    | Stormwater Collection               |
| SWTD    | Stormwater Treatment Device         |
| SWSC    | Stormwater Service Connection       |

### 5.5. LU\_3W\_ENDUSER\_TYPE

The type of end-user for the three water service.

| LU_CODE | LU_VALUE         |
|---------|------------------|
| RESL    | Residential      |
| COMM    | Commercial       |
| INDL    | Industrial       |
| PBLC    | Public Amenities |

### 5.6. LU\_PW\_PIPE\_TYPE

The operational function of the potable / water supply piping system.

| LU_CODE | LU_VALUE                                 |
|---------|--|
| TRAN    | Transmission Main                        |
| MAIN    | Main                                     |
| SERV    | Service Connection                       |
| FIRE    | Service (Fire)                           |
| INTK    | Intake main                              |
| DSCH    | Outfall / Discharge / Scour              |
| HHLD    | Household Connection                     |
| VENT    | Vent line                                |
| DUCT    | Repurposed Pipe eg Structural Protection |

### 5.7. LU\_WWSW\_PIPE\_TYPE

The Operational function of the waste and stormwater piping system.

| LU_CODE | LU_VALUE                                 |
|---------|--|
| TRNK    | Trunk Main                               |
| MAIN    | Main                                     |
| SERV    | Service Connection                       |
| DSCH    | Outfall/Discharge                        |
| FDRN    | Field Drain                              |
| CULV    | Culvert (See also WWSW Culvert Type)     |
| SULD    | Sump Lead                                |
| HHLD    | Household Connection                     |
| DUCT    | Repurposed Pipe eg Structural Protection |

### 5.8. LU\_3W\_CLASSIFICATION

The pipe classification tables are derived from the RSWS, the approved products register and their applicable NZ Standards.

| LU_CODE | LU_VALUE          |
|---------|-------------------|
| PN3.2   | Nominal Pressure: |



| LU_CODE | LU_VALUE   |
|---------|--|
| PN4     | Nominal Pressure:  |
| PN4.5   | Nominal Pressure:  |
| PN6     | Nominal Pressure:  |
| PN8     | Nominal Pressure:  |
| PN9     | Nominal Pressure:  |
| PN10    | Nominal Pressure: PE100-SDR17 (Series 1 - Drainage Pipes)                      |
| PN12    | Nominal Pressure: mPVC; PVC (S1)   |
| PN12.5  | Nominal Pressure: mPVC (ANS:4765)  |
| PN15    | Nominal Pressure: mPVC; PVC (S1)   |
| PN16    | Nominal Pressure: PE100-SDR11 (S2 Water Pipes); mPVC; PVC (S1); DI; DICL;DIPL; |
| PN18    | Nominal Pressure: mPVC; PVC (S1);  |
| PN20    | Nominal Pressure: PVC; DI; DICL;DIPL; ST, STCL, STCLPE(375-550nb)              |
| PN25    | Nominal Pressure: DI; DICL; DIPL; ST, STCL, STCLPE(600-1050nb)                 |
| PN35    | Nominal Pressure: DI; DICL; DIPL   |
| PN40    | Nominal Pressure: DI; DICL; DIPL   |
| PN45    | Nominal Pressure: DI; DICL; DIPL   |
| SN4     | Stiffness Class: uPVC DWV (NZS:1260 table 1.1)                                 |
| SN6     | Stiffness Class: uPVC DWV (NZS:1260 table 1.1)                                 |
| SN8     | Stiffness Class: uPVC DWV (NZS:1260 table 1.1)                                 |
| SN10    | Stiffness Class: uPVC DWV (NZS:1260 table 1.1)                                 |
| SN16    | Stiffness Class: uPVC DWV (NZS:1260 table 1.1)                                 |
| Class2  | Load Class2 - Concrete Pipe (NZS:4058 table 4.2)                               |
| Class3  | Load Class3 - Concrete Pipe (NZS:4058 table 4.2)                               |
| Class4  | Load Class4 - Concrete Pipe (NZS:4058 table 4.2)                               |
| Class6  | Load Class6 - Concrete Pipe (NZS:4058 table 4.2)                               |
| Class8  | Load Class8 - Concrete Pipe (NZS:4058 table 4.2)                               |
| Class10 | Load Class10 - Concrete Pipe (NZS:4058 table 4.2)                              |

### 5.9. LU\_3W\_PIPE\_USE

This is how the piping system operates.

| LU_CODE | LU_VALUE                                   |
|---------|--|
| PRES    | Pressure Pipe                              |
| GRAV    | Gravity                                    |
| VACU    | Vacuum                                     |
| SYPH    | Syphon                                     |
| VIRT    | Virtual – used for Modelling purposes only |

### 5.10. LU\_3W\_PIPE\_JOINT\_TYPE

Type of joints used on the piping system.

| LU_CODE | LU_VALUE                           |
|---------|------------------------------------|
| EFBW    | Electro Fusion Butt Weld Joint     |
| EFSW    | Electro Fusion Socket Weld Joint   |
| FJNT    | Flush Joint - not preferred option |
| FLG     | Flange Bolted                      |
| MCJ     | Mechanical Coupling Joint          |
| RRJ     | Rubber Ring Joint                  |
| RRRJ    | Restrained Rubber Ring Joint       |
| SCJ     | Solvent Cement Joint               |
| SCRW    | Screw Thread Fitting               |
| SW      | Socket Weld – Metal Weld           |

| LU_CODE | LU_VALUE  |
|---------|---|
| BW      | Butt Weld – Metal Weld                                |
| NA      | Not Applicable  |
| MFA     | Mechanical Flange Adapter                             |
| VJ      | Viking Johnson Mechanical Coupling (Historic to GWRC) |
| GBLT    | Mechanical Coupling Joint (eg Gibault)                |
| LOCK    | Lockbar (Historic - Used by GWRC in 1920s OK Main)    |

### 5.11. LU\_3W\_PIPEINSTALL

The method of installation or protection method of the section piping system.

| LU_CODE | LU_VALUE                                       |
|---------|--|
| AGRD    | Above Ground                                   |
| BORD    | Bored  |
| TREN    | Trench   |
| TUNL    | Tunnel   |
| PIBU    | Pipe Burst                                     |
| DUCT    | Installing inside a duct                       |
| SLAB    | Installed under a concrete slab for protection |

### 5.12. LU\_WWSW\_PIPE\_SHAPE

Type of waste and stormwater pipe shape.

| LU_CODE | LU_VALUE                               |
|---------|--|
| ARCH    | Arch shaped pipe                       |
| CIRC    | Circular pipe                          |
| EGG     | Egg shaped pipe (Circles touching )    |
| EGG2    | Egg shaped pipe (Circles not touching) |
| OVAL    | Oval pipe                              |
| RECT    | Rectangular pipe                       |
| UTOP    | U-shaped pipe                          |
| TBD     | To Be Defined                          |

### 5.13. LU\_WWSW\_CULVERT\_TYPE

Culvert pipe shape type.

| LU_CODE | LU_VALUE         |
|---------|------------------|
| PIPE    | Pipe             |
| PPAR    | PipeArch         |
| ARCH    | Arch             |
| RECT    | Rectangle or Box |

### 5.14. LU\_PW\_VALVE\_TYPE

The specific valves type used in the potable / water supply and raw water networks.

| LU_CODE | LU_VALUE                     |
|---------|------------------------------|
| ARVS    | Air Release Valve - Single   |
| ARVD    | Air Release Valve - Double   |
| ARVV    | Air Release and Vacuum Valve |
| AVAC    | Air Vacuum Valve             |
| BALL    | Ball Valve                   |
| BFLY    | Butterfly Valve              |
| DIAPH   | Diaphragm Valve              |

| LU_CODE | LU_VALUE  |
|---------|---|
| GATE    | Gate / Sluice Valve   |
| GLOBE   | Globe Valve / Altitude valve                                |
| MANFLD  | Valve / BFP / Strainer unit                                 |
| KGATE   | Knife Gate Valve  |
| CHCK    | Check Valve - Non Return Valve                              |
| BFP     | Back Flow Preventer   |
| RPZ     | Reduced Pressure Zone Valve                                 |
| PCV     | Pressure Control Valve - Regulating / Reducing / Sustaining |
| PRV     | Pressure Relief Valve - Thermal Expansion                   |
| FCV     | Flow Control Valve - Orifice                                |
| FLOAT   | Plunger Float Valve   |

### 5.15. LU\_PW\_HYDRANT\_TYPE

Standard fire hydrant valve type.

| LU_CODE | LU_VALUE            |
|---------|---------------------|
| FHSQT   | Fire Hydrant Squat  |
| FHMED   | Fire Hydrant Medium |
| FHTAL   | Fire Hydrant Tall   |

### 5.16. LU\_WWSW\_VALVE\_TYPE

Type of valves in the waste and stormwater networks.

| LU_CODE | LU_VALUE                                |
|---------|---|
| ARVS    | Air Release Valve - Single              |
| ARVD    | Air Release Valve - Double              |
| BALL    | Ball Valve                              |
| BFLY    | Butterfly Valve                         |
| GATE    | Gate / Sluice                           |
| CHCK    | Check Valve / Non-Return Valve / Reflux |

### 5.17. LU\_3W\_VALVE\_Control

Type of valve control mechanism.

| LU_CODE | LU_VALUE                 |
|---------|--------------------------|
| MANU    | Manual Operation         |
| AUTO    | Automatic e.g. PCV / FCV |
| REMT    | Remote / SCADA           |
| FLOT    | Float Operation          |

### 5.18. LU\_3W\_VALVE\_Purpose

Type of valves in the waste and stormwater networks.

| LU_CODE | LU_VALUE       |
|---------|----------------|
| ISOLT   | Isolate        |
| CONTL   | Control        |
| SCOUR   | Scour / Drain  |
| VENT    | Vent / Exhaust |
| SERV    | Service Valve  |
| FIRE    | Fire Service   |

### 5.19. LU\_3W\_VALVE\_Status

**The Valves' normal operational mode.** To change this status will require a permit to work (PTW) during the operations and maintenance activities.

| LU_CODE | LU_VALUE        |
|---------|-----------------|
| NO      | Normally Open   |
| NC      | Normally Closed |
| LO      | Locked Open     |
| LC      | Locked Closed   |

### 5.20. LU\_3W\_VALVE\_USE

This is how the Valve and Piping System operates.

| LU_CODE | LU_VALUE                        |
|---------|---------------------------------|
| PRES    | Pressure Pipe                   |
| GRAV    | Gravity                         |
| VACU    | Vacuum                          |
| SYPH    | Syphon                          |
| COMB    | Combined Air Vent and Vac Break |

### 5.21. LU\_3W\_FITTING\_TYPE

The specific fittings or nodes that are used in the three waters networks.

| LU_CODE | LU_VALUE               |
|---------|------------------------|
| BEND    | Bend Preformed         |
| CROS    | Cross                  |
| END     | End Cap or Blank       |
| JOIN    | Joint                  |
| REDU    | Reducer                |
| TAPB    | Tapping Band           |
| TEE     | T or Y Fitting         |
| SPEC    | Special Item           |
| GIBT    | Gibault Joint          |
| FLEX    | Flexible Connector     |
| LATL    | Lateral Connection     |
| INND    | Inlet Open End         |
| OTND    | Outlet Open End        |
| INGD    | Inlet Grated Open End  |
| OTGD    | Outlet Grated Open End |
| KERB    | Kerb pavement edge     |
| HHLD    | Household              |
| BNDY    | Boundary               |
| STRN    | Strainer / Filter      |
| VALV    | Valve                  |
| METER   | Meter                  |

### 5.22. LU\_3W\_METER\_TYPE

The specific customer group being metered.

| LU_CODE | LU_VALUE    |
|---------|-------------|
| BULK    | Bulk Supply |

| LU_CODE | LU_VALUE               |
|---------|------------------------|
| DMA     | District Metering Area |
| COMM    | Commercial             |
| RESL    | Residential            |
| INDL    | Industrial             |
| PBLC    | Public Amenities       |

### 5.23. LU\_3W\_METER\_MECHANISM

The specific operational type of meter.

| LU_CODE | LU_VALUE        |
|---------|-----------------|
| MECH    | Mechanical      |
| PROB    | Insertion Probe |
| ELMG    | Electromagnetic |
| TURB    | Turbine         |
| ORIF    | Orifice Plate   |
| ULTR    | Ultrasonic      |
| MGFL    | Magnetic Flow   |

### 5.24. LU\_3W\_ACCPOINT\_TYPE

The specific type of access chamber.

| LU_CODE | LU_VALUE                          |
|---------|-----------------------------------|
| MH      | Access Chamber / Maintenance Hole |
| ACAV    | Air Valve Chamber                 |
| ACBP    | Bypass Chamber                    |
| ACCD    | Cable Draw Point                  |
| ACVL    | Valve Chamber                     |
| ACFM    | Flowmeter Chamber                 |
| ACGW    | Gauging Weir Chamber              |
| LHCE    | Inspection Point (Pipe Eye 72)    |
| ACPU    | Pump Chamber                      |
| ACSY    | Syphon Chamber                    |
| ACVU    | Vacuum Chamber / Pit              |
| ACDP    | Discharge Point                   |
| ACVP    | Vent Point                        |
| ACBH    | Bore Hole (Well / Wellhead )      |
| ACCL    | Chlorination Point                |
| ACDW    | Dry Well                          |
| ACWW    | Wet Well                          |

### 5.25. LU\_3W\_ACCPOINT\_LID\_MATRL

Specific lid or cover material of construction.

| LU_CODE | LU_VALUE                 |
|---------|--------------------------|
| DI      | Ductile Iron             |
| GRP     | Glass Reinforced Plastic |
| CONC    | Concrete                 |
| ST      | Steel                    |
| GCI     | Grey Cast Iron (AS1830)  |

### 5.26. LU\_SW\_DEVICE

Stormwater Treatment Device.

| LU_CODE | LU_VALUE                     |
|---------|------------------------------|
| WETL    | Constructed Wetlands.        |
| BIOR    | Bio-retention (Raingardens). |
| VEGS    | Vegetated swales.            |
| PPAV    | Pervious paving.             |

### 5.27. LU\_SW\_CHANNEL

Type of stormwater channel.

| LU_CODE | LU_VALUE  |
|---------|---|
| NCHN    | Natural Channel                                 |
| OCHN    | Drain / Open Channel / Kerb                     |
| SWAL    | Swale / Shallow Channel                         |
| LCHN    | Lined channel                                   |
| STRM    | Stream  |
| RIVR    | River   |
| SWCX    | Virtual Natural Connection for River/Stream etc |

### 5.28. LU\_SW\_CHANNEL\_SHAPE

Open channel shape type.

| LU_CODE | LU_VALUE                |
|---------|-------------------------|
| EGOC    | Egg Shaped Open Channel |
| TRPZ    | Trapezoidal Channel     |
| RECT    | Rectangular Channel     |
| UTOP    | U-shaped Channel        |

### 5.29. LU\_SW\_SUMP\_TYPE

Sump or catchpit to capture stormwater for drainage.

| LU_CODE | LU_VALUE               |
|---------|------------------------|
| SMP1    | Sump Single Side Entry |
| SMP2    | Sump Double Side Entry |
| SMP3    | Sump Triple Side Entry |
| SMP4    | Sump Quad Side Entry   |
| SMPC    | Sump Corner            |
| SMPD    | Sump Dome              |
| SMPH    | Sump Hillside          |
| SMPFT   | Sump/Catchpit W Filter |
| SOAK    | Soakpit                |

### 5.30. LU\_WW\_TRAP\_TYPE

Traps to capture and settle solid waste from the wastewater system.

| LU_CODE | LU_VALUE              |
|---------|-----------------------|
| TRP1    | Food Oil & Grease     |
| TRP2    | Gully                 |
| TRP3    | Inspection            |
| TRP4    | Master                |
| TRP5    | Overflow Relief Gully |

### 5.31. LU\_3W\_MATERIAL

Commonly used Materials for new assets. The Coating and Lining material codes are included in the coding if pipes are manufactured and supplied as such. Note: normal paint coating is denoted as a given coating and not coded.

| LU_CODE | LU_VALUE  |
|---------|---|
| ABS     | Acrylonitrile Butadiene Styrene                                       |
| BRASS   | Brass   |
| DI      | Ductile Iron (Paint Coating)  |
| DICL    | Ductile Iron Concrete Lined (Paint Coating)                           |
| DICLZE  | Ductile Iron Concrete Lined ZincEpoxy Coating                         |
| DICLPE  | Ductile Iron Concrete Lined PE Coated                                 |
| DIEL    | Ductile Iron Enamel Lined   |
| DIPU    | Ductile Iron Plastic Lined (Polyurethane)                             |
| GS      | Galvanised Mild Steel   |
| GRP     | Glass Reinforced Plastic / Fibreglass                                 |
| PP      | Polypropylene   |
| PE100   | HDPE / HPPE High Density Polyethylene / High Performance Polyethylene |
| PE80    | MDPE Medium Density Polyethylene                                      |
| mPVC    | Modified Polyvinyl Chloride   |
| uPVC    | Unplasticised Polyvinyl Chloride                                      |
| STCL    | Steel - Concrete lined (Paint Coating)                                |
| STCLPE  | Steel - Concrete Lined and PE Coated                                  |
| STEL    | Steel - Epoxy Lined   |
| STEN    | Steel Enamel Lined  |
| SS304   | Stainless Steel - 304 or 304L   |
| SS316   | Stainless Steel - 316 or 316L   |
| RCON    | Reinforced Concrete / all Concrete Structures                         |

### 5.32. LU\_3W\_COATING

Type of external coating applied to pipe or equipment for protection other than as part of the manufacturing process.

| LU_CODE | LU_VALUE                                   |
|---------|--|
| BITU    | Bituminous Asphalt Coating                 |
| PTWS    | Petrolatum Tape Wrapping System - eg Denso |
| FBEP    | Fusion Bonded Epoxy - eg Bildcote          |
| FBPE    | Fusion Bonded Polyethene -eg Sintakote     |
| HDPP    | Polypropylene Sleeve                       |
| HDPE    | Polyethelene Sleeve                        |
| GALV    | Zinc Galvanised                            |
| PANT    | Painted                                    |
| CEMM    | Cement/Mortar                              |
| ZNEP    | Zinc Epoxy Coating - ZE                    |
| CTEL    | Coal Tar Enamel                            |
| NA      | Not Applicable                             |
| UPVC    | UPVC Sleeve                                |

### 5.33. LU\_3W\_LINING

The type of pipe lining materials used post the installation of the piping system.

| LU_CODE | LU_VALUE                            |
|---------|-------------------------------------|
| CONC    | Concrete / Cement                   |
| EPOX    | Epoxy Resin (CIPP)                  |
| ENAM    | Enamel                              |
| HDPP    | Polypropylene Slip Lined            |
| HDPE    | Polyethelene Slip Lined             |
| PVC     | Polyvinyl Chloride Slip Lined       |
| PE      | Polyethylene Slip Lined             |
| GRP     | Glass Reinforced Plastic Slip Lined |
| BITU    | Bituminous Asphalt                  |
| NA      | Not Applicable                      |

### 5.34. LU\_3W\_GRND\_TYPE

The type of ground that the pipes or equipment are buried. Referenced: the major division classification of the Unified Soil Classification System ASTM D2487-00 & D2488-00.

| LU_CODE | LU_VALUE                    |
|---------|-----------------------------|
| GRAV    | Gravel - USCS Class         |
| SAND    | Sand - USCS Class           |
| SILT    | Silt - USCS Class           |
| CLAY    | Clay - USCS Class           |
| PEAT    | Peat / Organic - USCS Class |

### 5.35. LU\_3W\_BED\_BACKFILL\_MAT

As specified in the Regional Specification for Water Services (RSWS).

| LU_CODE | LU_VALUE                     |
|---------|------------------------------|
| CONC    | Concrete Bedding             |
| SAND    | Sand native to in-situ       |
| 5_20    | 5-20mm Drainage              |
| 5_40    | 5-40mm Drainage              |
| AP5     | AP5 for pipes < DN63         |
| AP10    | AP10 for pipes DN63 to DN150 |
| AP20    | AP20 for pipes > DN 150      |
| AP40    | TNZ M4 backfill              |

### 5.36. LU\_3W\_RESERVOIR\_TYPE

Types of reservoirs identified across the Region.

| LU_CODE | LU_VALUE                                      |
|---------|---|
| RSVR    | All Water Utility Storage Tanks or Reservoirs |
| EMTK    | Emergency Water Tank                          |
| TANK    | Privately Owned Water Storage Tank            |

### 5.37. LU\_PW\_BFP\_TYPE

Potable / Water Supply Backflow Pressure Preventer type

| LU_CODE | LU_VALUE                           |
|---------|------------------------------------|
| DCDA    | Double Check Detector Assembly     |
| DCV     | Double Check Valve (DCV)           |
| PVB     | Pressure Type Vacuum Breaker (PVB) |
| RAG     | Registered Air Gap                 |
| RBT     | Registered Break Tank              |



| LU_CODE | LU_VALUE                                |
|---------|---|
| RPDA    | Reduced Pressure Detector Assembly      |
| RPZD    | Reduced Pressure Zone Device            |
| SCDAT   | Single Check valve Detector Assembly    |
| SPVB    | Spill Resistant Pressure Vacuum Breaker |
| SCVT    | Single Check Valve (Fire Service only)  |

### 5.38. LU\_PW\_BFP\_PREVENT\_TYPE

Backflow preventer type

| LU_CODE | LU_VALUE               |
|---------|------------------------|
| F1      | Individual Protection  |
| F2      | Zone Protection        |
| F3      | Containment Protection |
| F4      | Combination Type       |

### 5.39. LU\_PW\_BFP\_HAZARD

Hazard level classification

| LU_CODE | LU_VALUE      |
|---------|---------------|
| UNKN    | Unknown       |
| LOW     | Low Hazard    |
| MED     | Medium Hazard |
| HIGH    | High Hazard   |

### 5.40. LU\_PW\_BFP\_BUSACT

Business activity classification

| LU_CODE | LU_VALUE                                   |
|---------|--|
| GARDN   | Market Gardens                             |
| PFARM   | Poultry Farms                              |
| DFARM   | Dairy Farms                                |
| DENTL   | Dental Surgeries                           |
| HOSPL   | Hospitals and Nursing Homes and Veterinary |
| MORTS   | Mortuaries and Funeral Parlours            |
| LABS    | Pathology labs                             |
| ABTTS   | Abattoirs                                  |
| BLEAC   | Bleaching works                            |
| BREWS   | Breweries, Cordial and Soft Drink Plants   |
| MEATS   | Butchers' Shops                            |
| CHEMS   | Chemical Plants                            |
| LAUND   | Dry Cleaners and Laundries                 |
| MILKP   | Milk Processing Plants                     |
| DYEWK   | Dyeing Works                               |
| ENGWK   | Engineering Works                          |
| POULT   | Poultry Processing Farms                   |
| PHOTO   | Photographic Developers                    |
| PLATS   | Plating Workings                           |
| OILSD   | Oil Storage Depots                         |
| TANNS   | Tanneries                                  |
| WOOLP   | Wool Processors                            |
| KITCH   | Commercial Kitchens                        |
| HOTLS   | Hotels                                     |

| LU_CODE | LU_VALUE                           |
|---------|------------------------------------|
| WASHF   | Car and Factory washing facilities |
| PLASTC  | Plastics manufacturers             |
| PAINT   | Paint applying workshops           |
| PESTS   | Pest control facilities            |
| XRAYS   | Photography & X-ray machines       |
| PORTS   | Ports, Piers and Docks             |
| RESCH   | Research facilities                |
| WASTE   | Council Sanitary Depots            |
| DOMRE   | Domestic and Residential           |
| BEAUT   | Beauty Salon and Hairdressers      |
| OFFIC   | Office block                       |
| EDUCT   | Education Facilities               |
| SUPER   | Supermarket                        |
| POOLS   | Swimming pools, spas & Gymsnasiums |

### 5.41. BFP CODES

#### Hazard type classification

| PropTypeCode | Property Type                                 | BusAct Code | Business/ Activity Type                    |
|--------------|---|-------------|--|
| AHI          | Agricultural and Horticultural and Irrigation | GARDN       | Market Gardens                             |
| AHI          | Agricultural and Horticultural and Irrigation | PFARM       | Poultry Farms                              |
| AHI          | Agricultural and Horticultural and Irrigation | DFARM       | Dairy Farms                                |
| HMF          | Health & Medical Facilities                   | DENTL       | Dental Surgeries                           |
| HMF          | Health & Medical Facilities                   | HOSPL       | Hospitals and Nursing Homes and Veterinary |
| HMF          | Health & Medical Facilities                   | MORTS       | Mortuaries and Funeral Parlours            |
| HMF          | Health & Medical Facilities                   | LABS        | Pathology labs                             |
| IC           | Industrial and Commercial                     | ABTTS       | Abattoirs                                  |
| IC           | Industrial and Commercial                     | BLEAC       | Bleaching works                            |
| IC           | Industrial and Commercial                     | BREWS       | Breweries, Cordial and Soft Drink Plants   |
| IC           | Industrial and Commercial                     | MEATS       | Butchers' Shops                            |
| IC           | Industrial and Commercial                     | CHEMS       | Chemical Plants                            |
| IC           | Industrial and Commercial                     | LAUND       | Dry Cleaners and Laundries                 |
| IC           | Industrial and Commercial                     | MILKP       | Milk Processing Plants                     |
| IC           | Industrial and Commercial                     | DYEWK       | Dyeing Works                               |
| IC           | Industrial and Commercial                     | ENGWK       | Engineering Works                          |
| IC           | Industrial and Commercial                     | POULT       | Poultry Processing Farms                   |
| IC           | Industrial and Commercial                     | PHOTO       | Photographic Developers                    |
| IC           | Industrial and Commercial                     | PLATS       | Plating Workings                           |
| IC           | Industrial and Commercial                     | OILSD       | Oil Storage Depots                         |
| IC           | Industrial and Commercial                     | TANNS       | Tanneries                                  |
| IC           | Industrial and Commercial                     | WOOLP       | Wool Processors                            |
| IC           | Industrial and Commercial                     | KITCH       | Commercial Kitchens                        |
| IC           | Industrial and Commercial                     | HOTLS       | Hotels                                     |
| IC           | Industrial and Commercial                     | WASHF       | Car and Factory washing facilities         |
| IC           | Industrial and Commercial                     | PLASTC      | Plastics manufacturers                     |
| IC           | Industrial and Commercial                     | PAINT       | Paint applying workshops                   |
| IC           | Industrial and Commercial                     | PESTS       | Pest control facilities                    |
| IC           | Industrial and Commercial                     | XRAYS       | Photography & X-ray machines               |

| PropTypeCode | Property Type             | BusAct Code | Business/ Activity Type           |
|--------------|---------------------------|-------------|-----------------------------------|
| IC           | Industrial and Commercial | PORTS       | Ports, Piers and Docks            |
| IC           | Industrial and Commercial | RESCH       | Research facilities               |
| FA           | Fixtures and Appliances   | WASTE       | Council Sanitary Depots           |
| FA           | Fixtures and Appliances   | DOMRE       | Domestic and residential          |
| FA           | Fixtures and Appliances   | BEAUT       | Beauty Salon and Hairdressers     |
| FA           | Fixtures and Appliances   | OFFIC       | Office block                      |
| FA           | Fixtures and Appliances   | EDUCT       | Education Facilities              |
| FA           | Fixtures and Appliances   | SUPER       | Supermarket                       |
| WTS          | Water treatment systems   | POOLS       | Swimming pools, spas & Gymnasiums |