Digital Asset Information & Modelling

DIGITAL ENGINEERING EXECUTION PLAN

Version: 1

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Watercare

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More information
If you have further queries, contact the Watercare Enterprise Model team or standards@water.co.nz

DOCUMENT CONTROL

Document owner

Role	Interface and Improvement Manager
Organisation	Watercare Services Limited

Version History

Version	Section	Description of revision	Date
0.1	N/A	The first draft shared for review and comment	16/12/2022
1	All Sections	Document revised	23/01/2023

Approvers / Reviewers

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1. Purpose

1.1 Background

This Digital Engineering Execution Plan (DEXP) has been developed to act as an overarching standard for the execution of digital engineering procedures on all projects across Watercare.

This document is one in a suite of Watercare documents which relate to Digital Engineering. It is assumed that the reader is familiar with the content of these documents shown below.

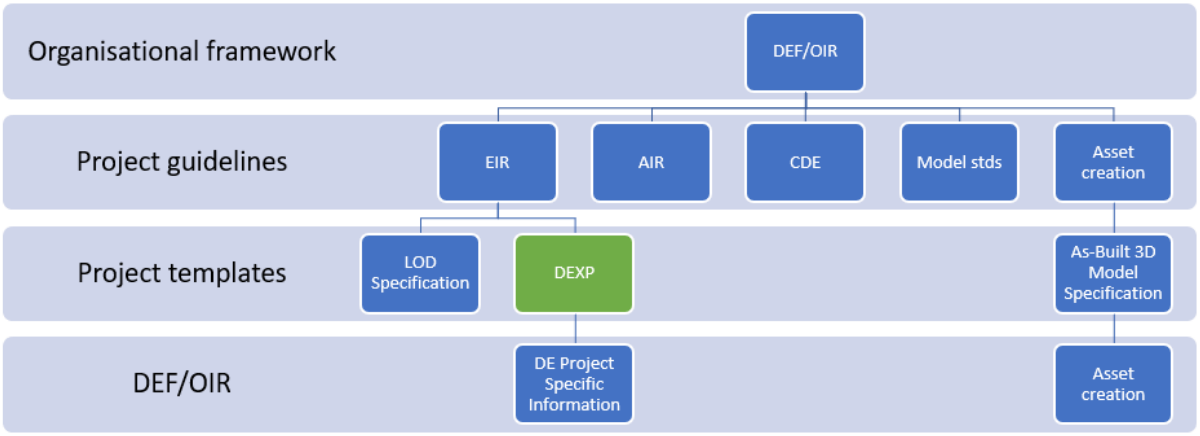


Figure 1 - Watercare Digital Delivery Documents

1.1.1 Updates to this document

This document will be reviewed regularly and in accordance with Watercare documentation and governance policies. The document owner is responsible for managing future updates. Any feedback or proposed changes should be sent to the document owner who will be responsible for revising, correcting, or updating this Execution Plan.

The Document Owner will need to undertake the following:

- The updates are validated by those whom they affect. Changes to this plan may affect other plans.
- The changes will then be built into the next formal review process and an updated version will be identified.
- Seek approval from the Watercare Enterprise Model leadership group and Watercare Operations, Strategy and Planning, and Digital representatives regarding proposed changes to the document.
- Consult with and inform digital representatives of all contracted partners regarding proposed changes to the document.
- Takes responsibility for updating the controlled document status, communicating the changes, and circulating the revised plan.

1.2 Compliance requirements

This document needs to be utilised in conjunction with Watercare standards and other Digital Engineering documents listed in Section 1.3.

1.3 Watercare Supporting documentation

- Digital Engineering Project Specific Information – January 2024
- Level of development Specification – January 2024
- As-Built Model Specification – January 2024

2. Introduction

This document exists to support Digital Engineering (also known as Building Information Modelling, or BIM) implementation across the Enterprise Model (EM). The Digital Engineering Execution Plan (DEXP) defines **who** is responsible for **what** in the Digital Engineering (DE) process, **when** in the process they are responsible for it, and **how** they will execute it. This Digital Engineering Execution Plan has been structured to provide a framework for the creation and progression of Building Information Models to meet Appointing Party's information requirements for the project and defines how information will be produced and managed during delivery.

The Enterprise Model partnership will help achieve Watercare's Strategic Goals, through specific objectives which are:

- reduce carbon in infrastructure by 40 per cent by 2025
- reduce the cost of infrastructure delivery by 20 per cent by 2024
- improve the health, safety and well-being of all people involved in delivering infrastructure by 20 per cent year-on-year.

Project specific digital delivery outcomes as detailed below:

Design:

- Improved transfer of knowledge and concept design artifacts from Strategic Planning Partners (SPP).
- A reduction in errors and omissions during design through improved coordination and clash detection between participating disciplines.
- Enhanced, early stakeholder engagement and operational rehearsals using static and interactive visualisations.
- Improved supply chain vendor integration.
- Accurate integration of the new design into any existing facility.
- Maximised benefits of practical and effective Early Contractor Involvement (ECI).
- Improved cost and programme visibility during design.
- Improved Safety in Design (SiD) through using the 3D model to inform the SiD conversation.

Construction:

- Zero or minimal defects captured early during construction phases.
- Improved risk management through construction rehearsal.
- Improved collaboration between supply chain vendors and sub contactors.
- Information captured is relevant to Operational needs.
- Improved Safety in Construction through using the 3D model.
- Assist the generation of quantity take-offs and cost estimates.
- Better understanding of the construction phasing sequence and identifying the critical paths.

Handover:

- Asset creation sheet completed and made available prior to handover stage.
- Accurate as-built documentation and models provided prior to handover stage.

3. Key Digital Delivery Business Owners

The key business owners of digitised asset models across Watercare includes Asset Information, Digital, Operations and Asset Lifecycle.

4. Digital Engineering Vision & Objectives

4.1 DE uses and Responsible Parties

The following DE uses have been identified by the Enterprise Model team as being able to support the achievement of the project outcomes defined at the start of this document. This table defines the desired benefits of DE for the programme, how the benefits are achieved, the applicable DE uses and the party responsible.

Table 1 - DE Uses

DE Benefit	Achieved how?	Applicable DE uses	Responsible Party
Interface and Scope management: Improve interface management and minimise scope gaps	Development of Model Element Author (MEA) tables clearly defining which parties are responsible for each model element during design, and the level they are to be developed to.	Existing Conditions Modelling, Design Review, Design Authoring, 3D Coordination, Record Modelling	**The Watercare EM (MP and AUR) team, SPP, DDP** and **CP**. Model Element Author to be developed as part of the LOD Specification.
Design Transparency: Provide a high degree of transparency of the overall design thus improving coordination between stakeholders and improving delivery regarding time, cost, and quality.	All relevant data is contained within a Common Data Environment (CDE) for all key design information thus avoiding conflicting data in different locations. The delivery team meet regularly to review and solve issues quickly and understand and identify interfaces using DE and Digital Delivery processes and tools.	Existing Conditions Modelling, Design Review, Design Authoring, 3D Coordination, Record Modelling	**SPP** and **DDP** to manage design CDE during design and construction stages. All information to be transferred to the Watercare information management system at Handover stage.
Design Quality: Improve design quality and reduce clashes and interface issues prior to construction to reduce the number of Requests for Information (RFIs) and minimise the number of design clashes.	The design geometry and data viewed and coordinated through 3D visual collaboration platforms. The information delivered in a consistent basis throughout the project, becoming the key source of design information for the wider project team. Drawings are derived from 3D models where possible ensuring there are minimal conflicts in the information.	Existing Conditions Modelling, Design Review, Design Authoring, 3D Coordination, Record Modelling	**SPP** and **DDP** to create, manage and update a 3D visual collaboration platform during design and construction stages.

DE Benefit	Achieved how?	Applicable DE uses	Responsible Party
	Reduction in number of sites RFIs or delays caused by poor design coordination. Clashes on site minimised or eliminated by early identification and mitigation prior to Issue for Construction (IFC) documentation.		
Procurement & Construction: Improve the performance in procurement and construction through DE processes.	Procurement of subcontractors is improved by issuing and demonstrating the scope of works through 3D models and extracts from DE, including for quantity and cost estimations. Key temporary and permanent works planning and coordination issues on site can be identified and mitigated early for a more efficient construction process.	Design Review, 3D Coordination, Cost Estimation, Phase Planning (4D Modelling)	**CP** to utilise digital information created during design phase to improve construction planning, construction rehearsal and risk management.
The handover and completions process: Provide As-Built drawings, P&IDS, documents and models and Asset Creation Sheets into the Watercare Asset Management Information System **(AMIS)**	Successful transfer of asset information (Asset Creation Sheets) and As-Built drawings and models to Watercare at handover stage.	Record Modelling	**DDP** and **CP** are responsible to share As-Built files and Asset Creation Sheets with the Watercare at the Handover stage.

5. Digital Engineering Roles and Responsibilities

The following section outlines the proposed Digital Engineering roles and responsibilities for all Enterprise Model projects.

5.1 Project Digital Engineering Manager

The Enterprise Model partners (SPP, DDP and CP) are required to appoint a Project Digital Engineering Manager for each phase of projects. The Project Digital Engineering Manager's responsibility is to make sure that the project objectives and Digital Engineering uses of each phase are achieved.

5.1.1 SPP Digital Engineering Manager's responsibility

The responsibilities of the SPP Digital Engineering Manager may include, but is not limited to:

- Lead the development and updates of the Project Specific Digital Engineering Execution Plan. This document will handover to DDP at the end of Concept design stage.
- Facilitate Digital Engineering meetings and workshops as required during the Feasibility & Optioneering and Concept design stages.
- Set up and drive a collaborative environment using Digital Engineering processes and tools on the project
- Clearly communicate information to the Digital Engineering team, Projects Managers and the Design Leads as required
- Manage collaboration with design team members about projects Digital Engineering objectives.
- Setup of Revit Control Model, Plant3D and Civil3D master files
- Set up, share, and manage CAD and modelling templates
- Setup the CDE that will be utilised during Feasibility & Optioneering and Concept design stages
- Drive model auditing and clash management process as appropriate for the Feasibility & Optioneering and Concept design stages
- Facilitate the set up and manage the ongoing use of issue tracking tools in the Digital Engineering environment.
- Set up and manage ongoing reporting of issue tracking.
- Manage handover of design information including drawings, P&IDs, reports, and 3D models to the DDP CDEs
- Manage collaboration with third party services, including survey and buried asset detection teams and WSL GIS team to receive reliable Reality Capture Information, Point Cloud data, Topography information and other data that need to be captured and developed by Survey team third parties.
- Manage development of the deliverable register (drawings, P&IDs, reports, and models).

5.1.2 DDP Digital Engineering Manager's responsibility

The responsibilities of the DDP Digital Engineering Manager may include, but is not limited to:

- Lead the development and updates of the Project Specific Digital Engineering Execution Plan.
- Facilitate Digital Engineering meetings and workshops as required during Developed and Detailed design stages
- Set up and drive a collaborative environment when using Digital Engineering processes and tools on the project
- Clearly communicate information to the Digital Engineering team, Projects Managers and the Design Leads as required
- Manage collaboration with design team members about projects Digital Engineering objectives
- Setup of Revit Control Model, Plant3D and Civil3D master files
- Setup CDE that will be utilised during Developed and Detailed design stages
- Drive model auditing and clash management process during Developed and Detailed design stages
- Facilitate the set up and manage the ongoing use of issue tracking tools in the Digital Engineering environment.
- Set up and manage ongoing reporting of issue tracking

- Manage development of as-built drawings, P&IDs, documents, and 3D models according to WSL and the EM standards
- Manage development of Asset Creation Sheet (first draft of asset shells)
- Manage collaboration with survey teams to receive reliable Reality Capture Information, Point Cloud data, Topography information and other data that need to be captured and developed by Survey team
- Manage development of the deliverable register (drawings, P&IDs, reports, and models).

5.1.3 CP Digital Engineering Manager's responsibility

The responsibilities of the CP Digital Engineering Manager may include, but is not limited to:

- Facilitate Digital Engineering meetings and workshops as required during Construction stages
- Set up and drive a collaborative environment when using Digital Engineering processes and tools on the project
- Clearly communicate information to the Digital Engineering team, Projects Managers, Construction Managers, and the Design Leads as required
- Manage collaboration with construction team, sub-contractors, suppliers and vendors about projects Digital Engineering objectives
- Review and check quality of 3D models developed by supplier and vendors
- Setup and manage construction Document Management System (DMS)
- Drive model auditing and clash management process during construction stage
- Facilitate the set up and manage the ongoing use of issue tracking tools in the Digital Engineering environment.
- Set up and manage ongoing reporting of issue tracking
- Lead the generation of quantity take-offs and cost estimates during the construction stage
- Lead the development of construction phasing sequence and identifying the critical paths
- Manage development of as-built documents and Redline markups.
- Manage development of Asset Creation Sheet.
- Manage collaboration with survey teams to receive reliable Reality Capture Information, Point Cloud data and other data that need to be captured by Survey team for As-Built stage.
- Lead coordination with the DDP Digital Engineering Manager to ensure as built and handover is completed in accordance with WSL standards.

5.2 Project Digital Engineering Coordinator

A Project Digital Engineering Coordinator (or Coordinators) will be appointed by each partner and to each Enterprise Model project when required. The Project Digital Engineering Coordinator's responsibility is to support the Digital Engineering Manager and make sure that from a technology perspective the project objectives and Digital Engineering uses are achieved, and that models are integrated and coordinated. This may include but is not limited to:

- Coordination of federated models
- Support the setup of Revit Control Model, Plant3D and Civil3D master files.
- Clash detection, clash resolution and clash report generation and circulation
- Facilitate model management and coordination meetings
- Communicate coordination issues back to project stakeholders
- Participate in the Digital Engineering Execution Planning process

5.3 Design Discipline Digital Engineering Lead

Each design discipline (Process Engineer, Structural Engineer, Civil Engineer, etc.) will appoint a Discipline Digital Engineering Lead. The responsibilities of the Discipline Digital Engineering Leads include, but are not limited to:

- Participating in the project Digital Engineering Execution Planning process
- Participating in design review and model coordination meetings
- Facilitating the use of the project Digital Engineering Execution Plan and other Enterprise Model standards within their discipline / team

- Confirm model files are developed in accordance with the project Digital Engineering Execution Plan and the Level of Development Specification
- Validating Levels of Model Development at each project stage
- Performing detailed model audits before issue to the wider team
- Communicating issues to Model Element Authors
- Implementing internal coordination and clash detection procedures
- Model transfer and version control
- Update the deliverable register (drawings, P&IDs, reports, and models)

The Discipline Digital Engineering Leads require an overall knowledge of Digital Engineering in relation to their discipline.

5.4 Model Element Author

The Model Element Author is any project stakeholder who will be developing the 3D models, drawings, P&IDs, and documents throughout the project delivery process. The Model Element Author responsibilities include, but are not limited to:

- Modelling elements in accordance with the Project Digital Engineering Execution Plan
- Modelling elements at the appropriate Level of Development as defined in the Enterprise Model Level of Development Specification
- Creating models, drawings, and documents in accordance with Watercare standards.

5.5 Responsibility Matrix (RACI)

The following RACI articulates the Digital Engineering and Digital Engineering responsibilities of different parties for the Enterprise Model.

Key	
R – Responsible for doing the activity	A – Accountable for activity completion
C – Consulted during activity	I – Informed followed activity completion

Table 2 - RACI Matrix

Functions	Activities & Deliverables	Project Manager (Watercare)	Digital Engineering Manager (SPP, DDP & CP)	Digital Engineering Manager / Coordinator (SPP, DDP & CP)	Design Discipline Digital Engineering Lead (Suppliers, SPP, DDP & CP)	Model Element Author (Suppliers, SPP, DDP & CP)	Discipline Engineering Lead	Design Manager	Design Lead	Construction Lead
Project Information Management	Develop the Digital Engineering Requirements and the end uses of information	A/R	C	I	I	I	I	C	I	I
	Specify the Organisation Information Requirements and Asset Information Requirements	A/R	I	I	I	I	I	I	I	I
	Confirm Asset Information deliverables	A/R	R	I	I	I	I	I	I	I
	Confirm information standards and procedures	A	A/R	I	I	I	I	R	R	R
	Set the requirements for the CDE	I	A/R	R	I	I	I	I	I	I
	Set the requirements for project Digital Engineering deliverables	A/C	A/R	C	I	I	I	I	I	I
	Lead overall Digital Engineering delivery on the project	I	R	R	I	I	I	I	I	I
Digital Engineering Management, Coordination	Lead the development of, and updates to the Project Digital Engineering Execution Plan	I	R	C	C	C	C	C	C	I
	Develop Digital Engineering related information for the contractor P&G specification	C	A/R	R	C	I	C	C	C	I
	Facilitating the use of the project Digital Engineering Execution Plan	-	A	R	R	R	R	R	R	I
	Setup of Control Model	-	A	R	C	C	I	I	I	I
	Coordination of federated models	I	A	R	R	C	A/I	A/I	A/I	I
	Lead the model coordination process through design	I	A	R	R/C	C	A/I	A/I	A/I	I
	Lead requirements review of the models during design	I	A	R	I	I	I	I	I	I
	Review the as built model and asset information deliverables prior to the contractor's final submission	I	A/R	R	I	I	I	I	I	I
	Set up and manage the ongoing use of issue tracking tools in the Digital Engineering environment.	I	A	R	R	C	A/I	A/I	A/I	I
Model Development and Design Management	Developing model files in accordance with the project Digital Engineering Execution Plan	-	I	I	R	R	A	I	I	I
	Modelling elements at the appropriate Level of Development as defined in the WSL Digital Engineering Execution Plan	-	I	I	A	R	A/R	I	I	I
	Validating Levels of Model Development at each project design stage	-	C	A	A/R	R	R	I	I	I
	Communicating issues to Model Element Authors and facilitating resolutions	-	A	R	A/R	R/C	I	I	I	I
	Implementing discipline model coordination and issue resolution procedures	-	I	I	R	R	A	C	C	I
	Model transfer and version control	I	A	R	R	R/C	R	I	I	I

Functions	Activities & Deliverables	Project Manager (Watercare)	Digital Engineering Manager (SPP, DDP & CP)	Digital Engineering Manager / Coordinator (SPP, DDP & CP)	Design Discipline Digital Engineering Lead (Suppliers, SPP, DDP & CP)	Model Element Author (Suppliers, SPP, DDP & CP)	Discipline Engineering Lead	Design Manager	Design Lead	Construction Lead
	Approve design changes proposed to resolve interface / coordination issues	C/I	I	I	I	I	A/R	R	R	C
Collaboration and general Communication	Establish the Common Data Environment	C	A/R	R	I	I	I	I	I	I
	Establish Digital Engineering processes on the project	C	A	R	C	I	C	C	C	I
	Implement Digital Engineering processes on the project	I	A	A/R	A/R	R	I	I	I	I
	Facilitate Stakeholder Digital Engineering meetings and workshops	C	A/R	C	I	I	I	C	C	C
	Facilitate Design Team Digital Engineering meetings and workshops	C	A	R	C	C	C	C	C	C
	Communicate Digital Engineering coordination issues back to the project team Digital Engineering	C	A	A/R	I	I	I	I	I	I
	Resolving Digital Engineering coordination issues	I	I	A/R	R	A	C	C	I	R
	Communicate as built / record modelling issues and progress back to the construction contractor	C	A/R	R	I	I	I	I	R	R
Digital Engineering Meetings	Project Digital Engineering Kick-Off	C	A/R	R	C	C	C	C	C	C
	Digital Engineering Execution Plan Workshop	C	A/R	R	C	C	C	C	C	C
	Digital Engineering Coordination Review	I	A/R	R	R	C	C	C	C	C
	Visual coordination and clash management workshop	C	A/R	R	R	C	C	C	C	C

6. Level of Information need

6.1 Asset Creation Sheet

The Watercare Asset Creation Sheet is to be utilised for asset data capturing and handover of asset information to the Watercare Asset Management team.

Refer ***Appendix I: Asset Creation Sheet*** for the steps for developing the Asset Creation Sheet for each project.

For detailed explanations on how to populate each entry of the Asset Creation Sheet, refer to the ***Watercare Asset Creation Guide.***

To determine which equipment to capture as assets, refer to:

- Section 3, Asset types and grouping rules for data capture of the ***Watercare Data and Asset Information Standard.***

6.2 Project Information Requirements

Refer to Section 8 for breakdown of all deliverables at each stage.

Refer to the Level of Development Specification for required non-graphical data.

6.3 Graphical Information Requirements

Typically, the following Levels of Development will apply to the project at each phase in accordance with the ticks in below. For further detail on the Levels of Development, refer to the ***EM Level of Development Specification***.

Table 3: Levels of Development

SPP		SPP		DDP		DDP		CP & Suppliers		CP & Suppliers		DPP, CP & Suppliers	
Feasibility & Optioneering		**Concept Design**		**Developed Design**		**Detailed Design**		**Fabrication**		**Construction**		**Handover**	
100	✓	100	✓	100	-	100	-	100	-	100	-	100	-
200	-	200	✓	200	✓	200	✓	200	-	200	-	200	-
300	-	300	-	300	-	300	✓	300	✓	300	-	300	-
350	-	350	-	350	-	350	-	350	-	350	✓	350	-
400	-	400	-	400	-	400	-	400	-	400	-	400	-
500	-	500	-	500	-	500	-	500	-	500	-	500	✓

6.4 Information Security

Project security requirements to be confirmed by Watercare for each project and documented in the Digital Engineering Project Specific Information template.

7. Project Information Standard

7.1 Standards and Guidelines

The core standards and guidelines that are to be used on the programme are:

Table 4: DE Standards and Guidelines

Type of guideline / standard	Title	Version
Information management	ISO 19650-2	2018
Level of information need	BIM Forum Level of Development Specification	December 2021
WSL Drawing Procedures and Standards	Standard for Producing CAD and Geospatial Drawings	Version 8.8
WSL Exchange Information Requirements	Exchange Information Requirements - Version 1 *(Exclusions to be captured in the DE project specific information template)*	April 2020
WSL Data and Asset Information Standard	Data and Asset Information Standard	Version 2.2
WSL Asset Creation Sheet	Asset Creation Sheet Template –	Version 6.10
WSL Asset Data Capturing Guideline	Asset Creation Guide	June 2021
Enterprise Model Deliverable	Level of development Specification	January 2024
Enterprise Model Deliverable	AsBuilt Model Specification	January 2024
Enterprise Model Deliverable	Digital Engineering Project Specific Information Template	January 2024

7.2 DE Object Classification

Refer to the ***WSL Data and Asset Information Standard for Data Hierarchy*** for details on Object Classification requirements.

Project specific classification system to be captured in the Digital Engineering Project Specific Information Template.

7.3 Drawing Convention and Standards

Refer to ***WSL Standard for Producing CAD and Geospatial Drawings***.

7.4 GIS Requirements and Standards

Refer to ***WSL Standard for Producing CAD and Geospatial Drawings***.

8. Information Delivery Plan

8.1 Schedule of Milestone DE Exchange and Deliverables

Table 5 - Milestone DE Exchange and Deliverables

Project Stage	DE Milestone	Date	Deliverables
Feasibility & Optioneering	N/A	Refer to Project Programme	• Feasibility & optioneering sketches and report
Concept Design	Client review and concept design approval		• Concept design P&IDs drawings and reports • Concept design Revit, C3D and P3D models • Field / survey data • Reality Capture Information • Existing condition modelling (if applicable) • Network servicing plans
Developed Design	Client review and developed design approval		• Developed design P&IDs drawings and reports • Developed design Revit, C3D and P3D models • Reality Capture Information • Existing condition modelling (if applicable) • Deliverable Register (drawings, P&IDs, reports, and models)
Detailed Design	Issued for construction		• Detailed design P&IDs drawings and reports • Detailed design Revit, C3D and P3D models • Reality Capture Information • Asset Creation Sheet (first draft of asset shells) • Deliverable Register (drawings, P&IDs, reports, and models)
Fabrication	Issued for Fabrication and construction		• Fabrication P&IDs drawings and reports • Fabrication Revit, C3D and P3D models (other formats need to be coordinated with the project DE Manager) • Asset Creation Sheet (first draft of asset shells) • Deliverable Register (drawings, P&IDs, reports, and models)
Construction	Issued for Handover		• Redline markups • Asset Creation Sheet • Reality Capture Information to support site verification • Deliverable Register (drawings, P&IDs, reports, and models)
Handover	Issued for Handover		• Site Verified P&IDs drawings and reports (.PDF and .DWG versions) • Native and .ifc versions of site verified Revit, C3D and P3D models • Native and .ifc versions of site verified fabrication and supplier models

Project Stage	DE Milestone	Date	Deliverables
			• Final version of Reality Capture Information • Final version of Asset Creation Sheet • Final version of Asset Creation Sheet • P&IDs, reports and models)

8.2 Timeframe of Deliverables and Responsible Parties

Figure 1 below identifies the key activities required to be undertaken in each phase of the project, and the responsible parties.

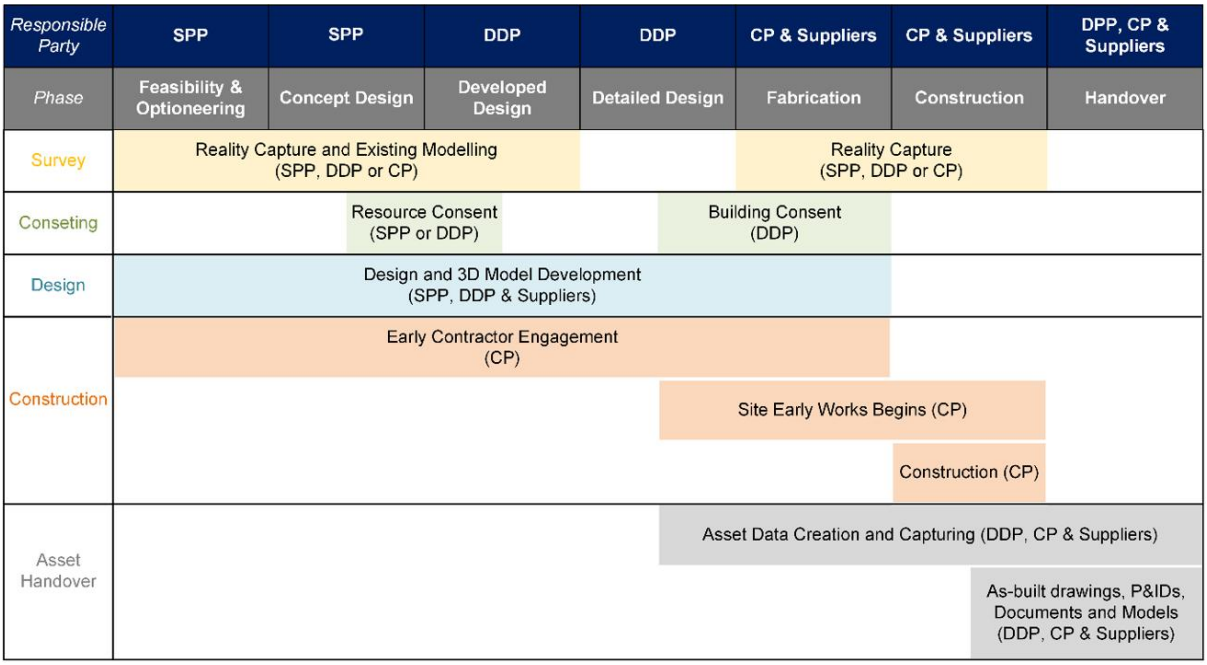


Figure 1 - Timeframe of Deliverables and Responsible Parties

8.3 Schedule of Design Development DE Exchange Formats

The following table details the file format for model exchanges to support on-going design development and coordination.

Table 6 - Design Development DE Exchange Formats

Purpose / Use	Details	Format
Design Model	• Autodesk Revit for Structural, Architectural and Services Design	. RVT
	• Autodesk Civil3D for Civil design • Autodesk Plant3D for Mechanical & Process design and Electrical, Instruments and Controls	. DWG
Federated (Coordination) Model	• Autodesk Navisworks or Revizto for visual coordination and clash detection	. NWC
Documents	• Audits, Checklists etc	. PDF

8.4 Design Development DE Exchange Frequency

Models are to be shared weekly on Friday by 3pm via Autodesk Construction Cloud (ACC) design collaboration module. The following table details the frequency of model exchanges to support on-going design development and coordination.

Table 7 - Design Development DE Exchange Frequency

Discipline	Feasibility & Optioneering	Concept Design	Developed Design	Detailed Design	Fabrication
Architectural	Weekly	Weekly	Weekly	Weekly	Weekly
Structural	Weekly	Weekly	Weekly	Weekly	Weekly
Services	Weekly	Weekly	Weekly	Weekly	Weekly
Civil	Weekly	Weekly	Weekly	Weekly	Weekly
Mechanical & Processes	Weekly	Weekly	Weekly	Weekly	Weekly
Electrical, Instruments and Controls	Weekly	Weekly	Weekly	Weekly	Weekly

8.5 Model and Data Update Description

As a minimum each discipline to provide a ‘start-up view’ within their model. This will contain a written log that identifies key amendments since the preceding issue. This will be updated prior to upload to the Common Data Environment. The process and details are to be documented in the DE Project Specific Information with respect to design authoring tools selected for each project

In ACC Design Collaboration Module, the “Package Description” should be used to serve as the model issue/change description that identifies key amendments since the preceding issue.

9. Technical - Collaboration

The Common Data Environment (CDE) is defined as a single source of information for any given project. It will function as a digital hub during design and construction stages within which project stakeholders can collect, manage, and disseminate all relevant approved project data in a managed environment.

Autodesk Construction Cloud (ACC) will be used as the Common Data Environment for the EM projects to store and share all consultants' live models during design and construction stages. Autodesk Desktop Connector will be used to upload non-Revit files such as CAD files, Point Clouds and IFC files to ACC, so that they can be linked into the Revit models. The project will be hosted on SPP and DDP hubs in ACC. A shared location will be set up, invitations and instructions for use will be sent out to all team members. Project parties will provide contact details for all team members likely to require access to the shared folder.

Teams set up in ACC, should follow the following format:

- Discipline-Company

The following are examples of these Team for EM projects:

- Civil-Stantec
- Process-Aurecon
- Structural-Beca
- Services-WSP
- Survey-FCC
- Construction-FH

When sharing models with the project team via the Design Collaboration, all transmitted models are automatically saved to the shared folder, replacing the previously issued model. Therefore, it is important that model file naming remains consistent. Information transmitted is only able to be accessed, viewed, and downloaded by those addressed in the transmittal. Please note, this is not setup as a storage site, each party is responsible for the downloading and saving of transmitted models to their own company servers. Models are to be uploaded to the CDE at agreed milestones, in the agreed formats. Please refer to Section 8 for more detail about Information Delivery Plan and Exchange procedures.

The image below outlines the approach to adopting ACC as a CDE to support the sharing of DE data

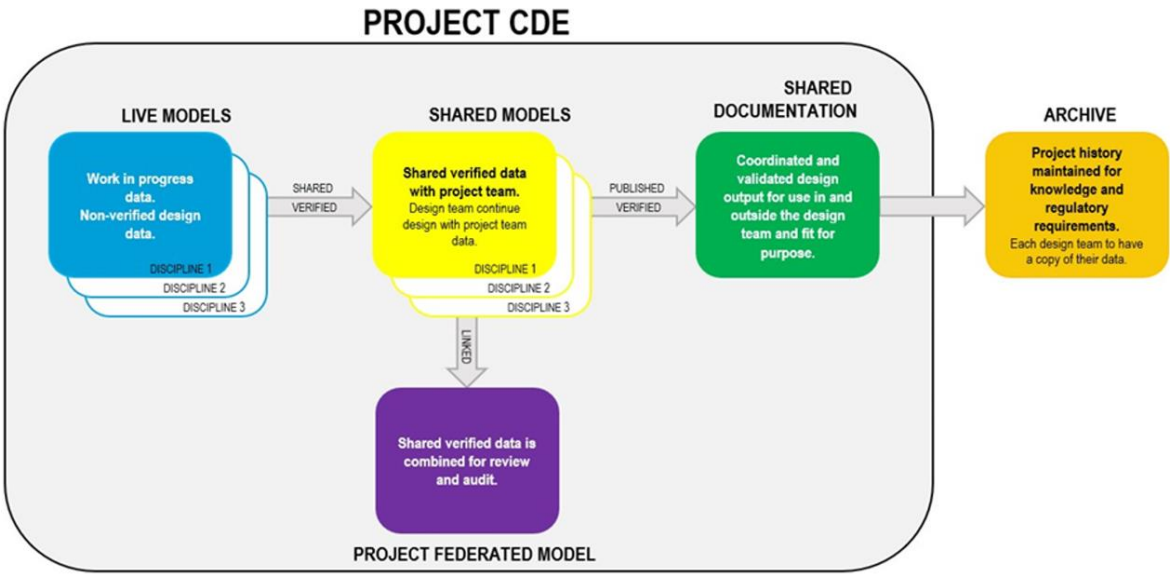


Figure 2 - Common Data Environment Workflow

The image below outlines specific stages that design information needs to be transferred to the CDE, or the information management hub of DDP, CP, and WSL.

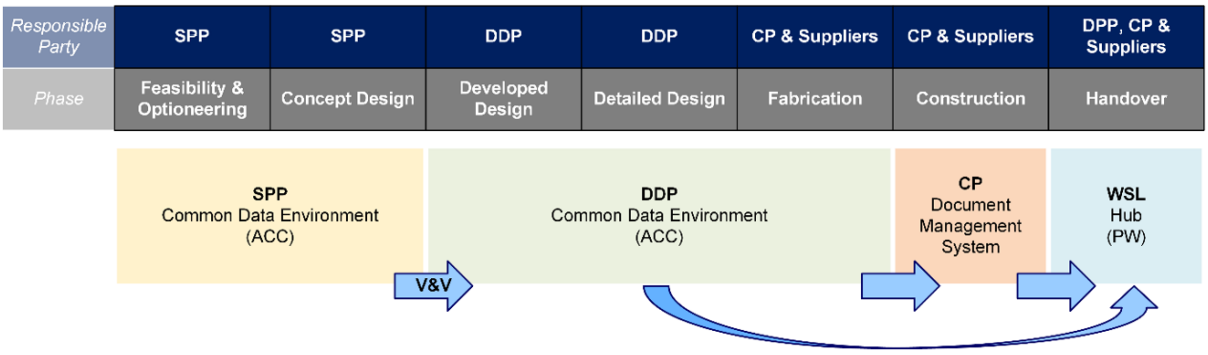


Figure 3 -The Overall Information Flow

9.1.1 ACC Access

Each project will have nominated ACC Administrators who are responsible for managing access to the ACC site. The contact details of the administrators are to be documented in Digital Engineering Project Specific Information Template.

9.1.2 DE Meetings

The following list of DE meetings are what we would expect to be run for each project. Any variations to this meeting schedule are to be documented in the Digital Engineering Project Specific Information Template.

Table 8 - DE Meeting Schedule

Meeting Type	Facilitator	Project stage	Frequency	Required attendees
Kick-Off Meeting	DE Manager, DE Coordinator	Project kick off	One off at start of each phase	SPP team DDP team Suppliers
On-going Digital Engineering Execution Planning	DE Manager, DE Coordinator	All stages	As required	SPP team DDP team Suppliers
3D Design Reviews	Design Lead, Discipline DE Lead	All Stages	Aligned with design team meetings	SPP team DDP team Suppliers CP team
Digital Engineering Coordination meeting	DE Manager, DE Coordinator	All stages	TBC	SPP team DDP team Suppliers
Asset Data Capturing Workshop	DE Manager, DE Coordinator	Detailed Design	One off	DDP team Suppliers CP team

Meeting Type	Facilitator	Project stage	Frequency	Required attendees
As Built Requirements Workshop	DE Manager, DE Coordinator	Detailed Design	One off	DDP team Suppliers CP team

10. Technical – Modelling

10.1 Software Versions

The software versions that will be used for the duration of the project are as follows:

Table 9 - Software versions

Software	Version	Disciplines Involved
Revit	2022	• Structural • Mechanical • Hydraulic • Electrical • Fire • Architectural
Civil 3D	2022	• Civil
Plant3D	2022	• Mechanical (Piping and Equipment) • P&ID
Navisworks or	2022	• All Stakeholders
Revizto	5	• All stakeholders

10.2 Model File Upgrade Mitigation

Where possible, all 3D model files should remain the same version for the duration of the project. If there is a requirement to upgrade the model files to a newer release of the software, the DE Manager will be informed and a strategy for file upgrades will be developed alongside the discipline DE leads

10.3 Phase Naming – Revit Specific

Table 10 - Phase Naming

Phase Name	Description
Existing	All objects that exist on site prior to the commencement of works will be modelled as 'created' in this phase.
New Construction	All objects that are built or installed as part of the construction works will be modelled as 'created' in this phase. All objects that are demolished or removed from site as part of the construction works will be modelled as 'demolished' in this phase.

For Projects with more than one stage, allow for additional phases, and document these within the Digital Engineering Project Specific Information Template for the project.

10.4 Phase Filters - Revit Specific

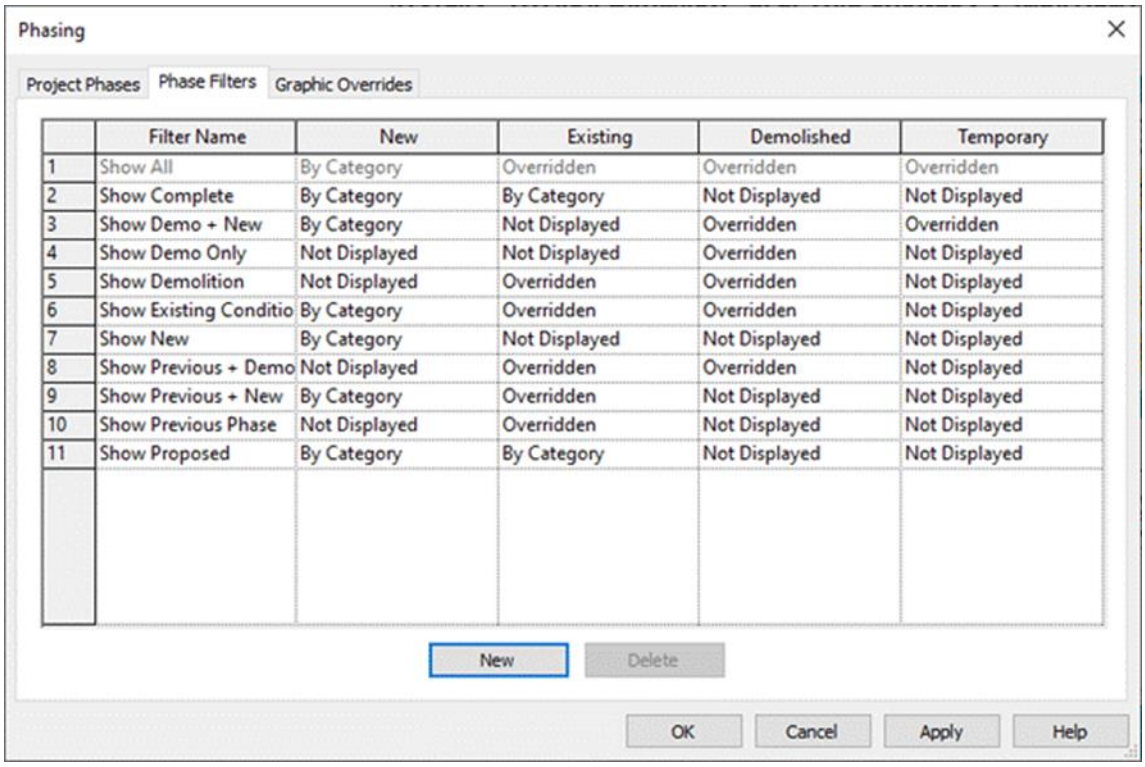


Figure 3 - Phase Filter

10.5 Workset Naming - Revit Specific

We promote the use of worksets within the Revit Authoring environment, this allows multiple team members to access and modify the model concurrently. It also aids in the division of the model in respect to work streams, allowing additional functionality within the Revit environment. It is the responsibility of each consultant to ensure modelled elements are on their correct worksets.

The table below describes an example of standard worksets to be present in all models which can be aligned with each company specific naming conventions, however, the CBI Codes (Level 2) should be followed.

Table 11 - Workset naming

CBI Code	Description	Notes
99	Levels & Grids	
99	Linked RVT_<Discipline>	To be expanded for individual Revit files
99	Linked DWG	
99	Setout	Includes Scope Boxes & Reference Places

10.6 Model Structure

Digital Engineering projects often require the segregation of data into manageable sized pieces. This can take many forms and is often unique to each project. In general, each building will have its own DE file for each discipline. If the model size exceeds upwards of 400MB, then the model will need to be divided by each discipline or into different building zones. Each company's discipline model shall link in the project site model to acquire the coordinates and the existing model information. If model files become unmanageable and require further separation, they will be separated along building lines, grid

lines or seismic lines according to the building zones. The modelling practices of each discipline should have provisions to achieve this. For example, disciplines could separate by:

- Models for different zones
- Worksets of different zones.
- Zone parameters that registered in every element.

10.7 Measurement and Coordinate System

The Digital Engineering Project Specific Information Template shall define the following:

- Model location and orientation
- Project Base Point (Revit)
- Survey Point (Revit)
- Coordinates system - ensuring alignment with Watercare GIS requirements.

10.7.1 Survey Datums

The following survey datums are applicable across the Enterprise Model:

Horizontal Datum	Vertical Datum
NZTM 2000	NZVD 2016

The following information shall be provided at a project level and to be captured in the Digital Engineering Project Specific Information Template:

- Geodetic Datum
- Project Site Model - Base Point information
- Project Site Model - Survey Point information

10.8 Modelling for Cost estimation

It is the intention of the Watercare that the Discipline DE Leads export DWFx files from Revit models and issues this information to the quantity surveyor to support their traditional estimation process when required, drawings will still take precedence for the costing.

The intention of this approach is to understand what value can be gained through the provision of additional information to support the estimate.

In order to schedule as much information as possible from the models, in addition to following the *NZIQS Australia and New Zealand BIM Best Practice Guidelines* for modelling, the following is required:

- Staging to be demarked in model objects e.g. demolished, new build, existing etc.
- Typical details / bays / typical sections (items replicated but modelled in only one area) are to be excluded from the DWFx export
- The cost manager is to be included in all review processes throughout design progression
- Items such as connections/walls to be demarked with 2D detail references
- Any placeholder items to have an indicative specification and size included in the object
- 2D sheets linked to the 3D model
- Any major changes to the design are to be made in the model rather than solely on the 2D drawings.

10.8.1 Quantity Surveyor Responsibilities

The quantity surveyor is ultimately responsible for the accuracy of the estimate including making allowance for all non-modelled construction costs such as (but not limited to) design complexity, constructability, material supply, waste, and non-modelled specified items. The quantity surveyor is also responsible for all costs and other allowances such as (but not limited to) preliminaries, margins, escalation, procurement, contingencies, consents, consultant cost and other client-side costs.

10.8.2 Object parameter & Units of Measure (UoM)

The key units of measure for geometric data extracted from objects are as in the table below. Generally, all object physical dimensions are driven from millimetres (mm) in one, two or three dimensions. All objects with an UoM of m² or m³ will need to be exported to three decimal places.

Table 12 Object Parameters in Unit of Measure

Parameter	Object UoM		Cost Plan UoM		Cost Plan Use
	Unit	Abbrev.	Unit	Abbrev.	
Count	Number	No	Number	No	Count of an object
Length	Millimetres	mm	Metres	m	Length or of an object
Height	Millimetres	mm	Millimetres	mm	Height of an object
Width	Millimetres	mm	Millimetres	mm	Width of an object
Depth	Millimetres	mm	Metres	m	Depth of an object
Perimeter	Millimetres	mm	Metres	m	Length of a perimeter
Area	Square metres	m²	Square metres	m²	Single face area of an object
Wall Area	Square metres	m²	Square metres	m²	Single face area of an object
Volume	Cubic metres	m³	Cubic metres	m³	Volume of an object
Weight	Kilograms	kg	Kilograms	kg	Weight of an object

10.9 Modelling Quality Control Checks

The following checks will be performed to assure quality within models and non-geometric information, to eliminate errors and achieve the desired project outcomes. An information container checklist must be completed by the task team member (the model element author) prior to model issue.

Table 13 - Model quality control checks

Check	Definition	Responsible Party
Visual check	Check for unintended model components and that design intent has been followed	Model Element Author
Design review	Review the on-going development of the model against the design intent	Model Element Author
Authoring software warnings	Review and resolve model warnings within the design authoring software	Model Element Author

10.9.1 Model sharing Checklists

A model sharing checklist will be completed by the model element author at the end of each design stage and prior to issuing models to other partners. A sample model sharing checklist is provided below.

Table 14 - Sample Model Sharing Checklist

Model File Checklist	Checked	Comments
Does the File Name comply with the agreed DEXP?	☐	
Is the model file size within the agreed project limitations? (e.g. 500mb for Revit files)	☐	
Has an MDD Document been provided alongside the model share?	☐	

Model Coordination Checklist	Checked	Comments
Are the Model coordinate systems correct? (for all issued file formats)	☐	
Have all blocker, critical and major coordination issues been resolved?	☐	
Model Development Checklist	**Checked**	**Comments**
Has the model been developed in accordance with the WSL LOD Specification? Please state and highlight any deviations	☐	
Is the model LOD correct for the project stage?	☐	
Do the model objects contain the correct asset information for the project stage?	☐	
Have all floating/stray items been removed from project?	☐	
Have phases been correctly assigned to model elements?	☐	

10.10 Shared Parameters / Attributes

The following parameters to be added to all Revit and Plant3D model elements.

Table 15 - Typical Watercare Shared Parameters / Attributes

Asset Parameter	Required Asset Data	Comment
WSL Design Status	IFIR (Issued for Internal Review) or IFCR (Issued for Client Review) or IFC (Issued for Construction)	
WSL Design Verifier	Initials (e.g. DJS)	
WSL Design Verification Date	DD.MM.YY	
WSL Phase	Existing or New Construction	
WSL AsBuilt Status	Verified	
WSL As Built Verification Primary Source Name	3258696-DTHEL-00-SV-PointCloud-Beca-2021	
WSL As Built Verification Primary Source Version	V1 (version of Point Cloud)	
WSL As Built Verification Secondary Source Name	DTHEL-00-M-00	
WSL Verification Secondary Source Version	A (version of P&ID or drawing)	
WSL As Built Verification Tolerance	+/-25mm	Refer to As Built Requirements
WSL AsBuilt Verifier	Initials (e.g. DJS)	
WSL AsBuilt Verification Date	DD.MM.YY	
WSL Tag/Equipment Number	91-RV-012	As per P&IDs and drawings

Asset Parameter	Required Asset Data	Comment
WSL Pipeline Number	91-TW-002-ELS-1200	As per P&IDs and drawings

11. Technical – Clash Detection & Issue Management

11.1 Coordination Strategy

Successful model coordination relies on the different disciplines understanding their roles and only modelling what they are responsible for in accordance with the Model Element Author Schedule. Coordination is much more than just clash detection; the key to successful coordination is identifying issues, assigning relevant project stakeholders to the issues, and tracking the issues until they are resolved.

As coordination issues usually require design input, these issues will be addressed in the regular design meetings. An agenda for these meetings will be included to highlight key issues and eliminate the need for duplicate meetings. Below is the proposed approach to coordination for this project.

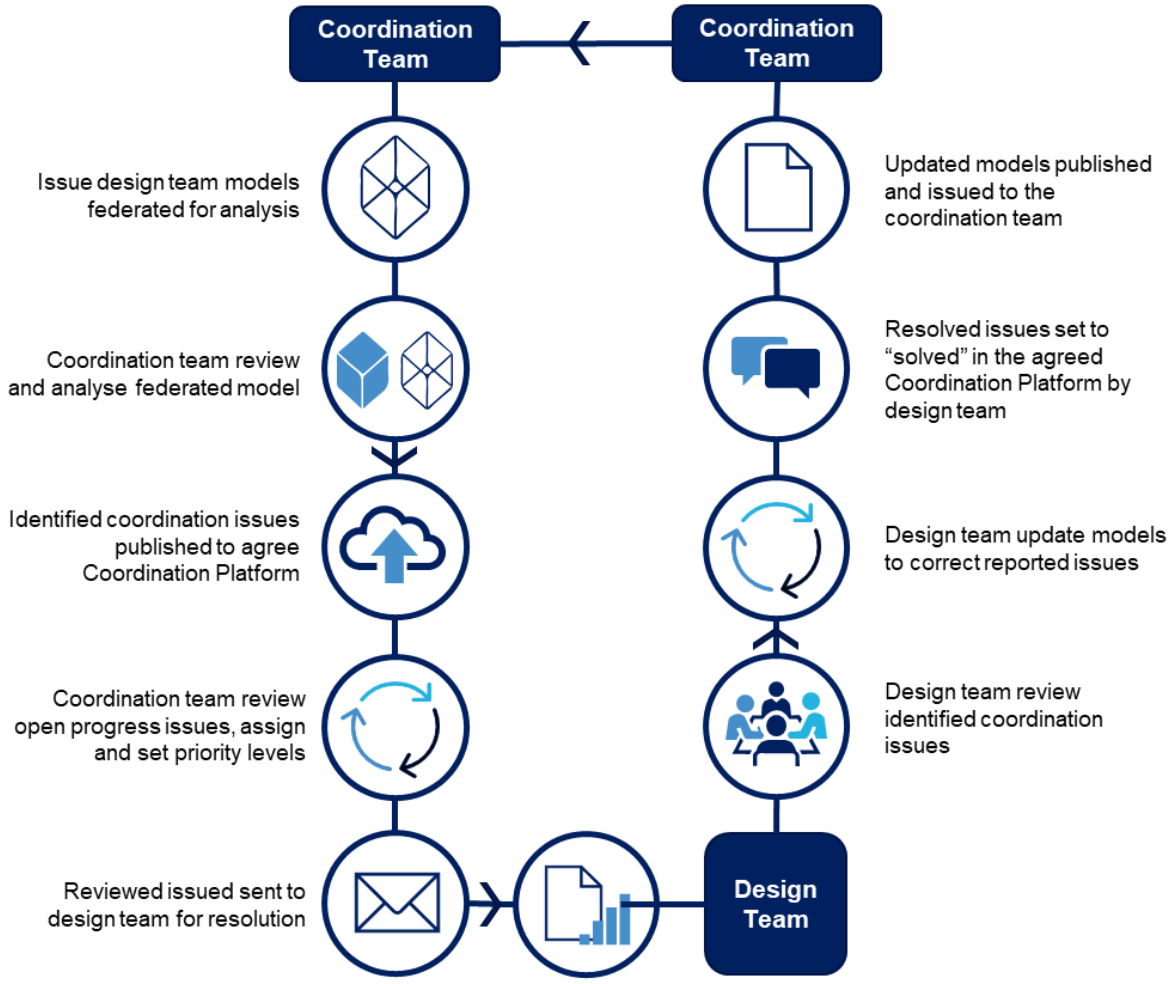


Figure 4 - Coordination Process

11.2 Internal Coordination Reviews

Each discipline will be responsible for implementing an internal coordination review system and carrying out self-reviews at regular intervals as appropriate for the discipline concerned and the design effort being expended at that project stage.

Coordination issues identified that require input from other parties will be raised at the following design meeting at the latest. However, it is preferable to maintain open lines of communication and resolve the issue directly via phone, email, or web conferencing. The design meeting can then be used to inform the wider design team of the proposed solution and ensure there are no unforeseen issues.

Issues identified because of internal coordination reviews may be entered into issue tracking software as user generated issues, if not already present.

11.3 External Coordination Reviews

The Digital Engineering Manager will carry out the external coordination reviews using the ACC Design Collaboration module and Revizto or Navisworks.

These reviews will be structured to seek and highlight major issues that affect constructability. They should not impose additional costs on the project by circulating unfiltered lists which include false positives or phantom clashes.

11.4 Coordination Meetings

Coordination reviews will be carried out as per Coordination Meetings Schedule during periods of design activity & may be suspended when activity is paused, such as during review & consultation periods, or held as required by the project and agreed by the parties concerned.

Typically, the Coordination Meetings will be held weekly. Any variation to this frequency should be documented in the Digital Engineering Project Specific Information Template.

Table 16 - Example Coordination Meetings Schedule

Meet Type	Facilitator	Project Phase	Schedule Frequency	Required Attendees
Design coordination meeting	Design Leads	All Design Stages	Weekly	SPP or DDP, CP and Suppliers

11.5 Clash Types

There are two types of clashes, hard clashes, and soft clashes. These are defined as:

- **Hard Clash** - occurs when two objects are physically clashing or intersecting, i.e. a steel beam that intersects a mechanical duct.
- **Soft Clash** - occurs when an object interferes with another object's defined clearance zone. Implement clearance zones to ensure accessibility. Consider maintenance and installation safety as part of the clash detection process.

11.6 Issue Tracking

Once the clashes and any other issues have been identified, they will be pushed through to the issue management platform, or an agreed alternative issue tracking software. This will be used to further enhance the clash resolution process and manage clashes, and after each coordination review, the filtered and grouped issues will be loaded into Revizto. Within Revizto, the issues will be given a priority ranking and allocated to the relevant design team for resolution.

The Digital Engineering Manager will allocate issues via Revizto or Navisworks to the appropriate Discipline Digital Engineering Leads. The Discipline Digital Engineering Leads will then communicate this issue within their own team as appropriate & make sure issues are followed up and resolved.

11.6.1 Clash Priority Ranking

As the Digital Engineering Project Specific Information Template is populated for projects, the Digital Engineering Manager, Discipline Digital Engineering Leads, and Design Leads should define the clash priority rules for each element within the model, including defining clash priority definitions and populating a clash priority table.

For the typical definitions used in New Zealand, as per the *NZ BIM Handbook*. refer Table 17 below.

Table 17 - Clash Priorities Definitions

Priority	Definition	Examples
1	**Critical-priority** clashes are reported clashes that are considered critical to the design and construction process. The highest priority is assigned to rectifying them as soon as possible after detection.	Process equipment, primary structure, and main service routes or zones.
2	**High-priority** clashes are reported clashes that are considered important to the design and construction process. They should be rectified during design phases.	Process pipes that are 100mm in diameter or greater, secondary structure.
3	**Medium-priority** clashes are reported clashes that, while considered important to the correctness of the model, will generally change on a regular basis throughout the design and construction process. They can be assigned a lower level priority and should be rectified before end of phase submissions of the models. Medium-priority clashes requiring further design input during detailed design will be elevated to major.	Process pipes that are less than 100mm in diameter.
4	**Low-priority** clashes are elements that will be moved without question during construction.	Process pipes that are less than 50mm in diameter.

11.7 Clash Matrix & Tolerance

A coordination model tolerance schedule shall be developed by the Digital Engineering Manager and agreed during the completion of the Digital Engineering Project Specific Information Template. The schedule defines coordination tolerances to be used between each discipline, at each design phase. Note: this table does not infer design tolerances.

Table 18 - Typical Tolerances

Discipline	Feasibility & Optioneering	Concept Design	Developed Design	Detailed Design	Fabrication	Construction
All Disciplines	N/A	50mm	25mm	0mm	0mm	0mm

A clash matrix will be developed by the Digital Engineering Manager during the completion of the Digital Engineering Project Specific Information Template, with inputs from the discipline Digital Engineering leads and members of the wider design team.

The matrix defines the discipline models and elements that will coordinate with each other. Coordination requirements may differ at different stages of a project. For example, during preliminary and developed design, model coordination may be generalised per discipline. As design progresses, you may be required to coordinate specific discipline elements. Please refer to Table 19 and ***NZ BIM Handbook, Appendix I - Model Coordination*** for example clash matrices

Table 19 - Example Clash Matrix

	ARC	STR	PCS	EIC	CIV	HVC	ELE	PLU	FIR	SUP	Notes
ARC	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Architectural and Landscape consultant
STR		S	Y	Y	Y	Y	Y	Y	Y	Y	Structural consultant
PCS			S	Y	Y	Y	Y	Y	Y	Y	Process and Mechanical consultant
EIC				S	Y	Y	Y	Y	Y	Y	Electrical, Instruments and Controls consultant
CIV					S	Y	Y	Y	Y	Y	Civil consultant
HVC						S	Y	Y	Y	Y	HVAC (Heating, ventilation, and air conditioning) consultant
ELE							S	Y	Y	Y	Electrical Consultant (Services)
PLU								S	Y	Y	Plumbing & Drainage consultant
FIR									S	Y	Fire consultant
SUP										S	Fabricators, Suppliers and Vendors

Key:

Y	Clash test required
	N/A
S	Subject to design discipline internal coordination

11.8 Clash Reporting

Once the Digital Engineering Coordinators have completed clash detection and updated Revizto or Navisworks, they will create a clash management report and provide this to the project team. This will be developed using the outputs from the Revizto or Navisworks and categorises and summarises the clashes by priority groups and discipline. This helps the design teams to focus their efforts on resolving “Critical-priority” and “High-priority” clashes to make sure any issue which may become critical is resolved ahead of minor issues.

The clashes must be resolved within a timeframe designated by the Digital Engineering Manager. Any objections to the timeframe must be raised at the time of reporting the issue.

12. Risk

Digital Engineering specific risks must be captured in the project risk register.

13. Standard terms and definitions

Table 20 - Standard terms and definitions

Terms	Definitions
.DWG	A Drawing file generated in Autodesk AutoCAD.
.NWS	A newsgroup file that stores messages made in a newsgroup.
.PDF	A document file including text formatting and images.
.RVT	A native 3D Model file generated in Autodesk Revit.
Appointing Party	From ISO 19650. The client or employer. The organization that is commissioning the project or owns the asset.
As-Built	Describing or representing the actual appearance, condition, structure, and location of a constructed asset
As-Built Verification	The process of verifying 3D design models against what built on site
Asset	Completed building, facility, equipment, element, or infrastructure
Asset Information Requirement	Information requirements in relation to the operation of an asset
Asset Shells	First draft of asset creation sheet
Autodesk Connector	Projects in BIM360 or ACC desktop connectors helps locate files in local and connects between cloud platform and local files.
Autodesk Construction Cloud	A software used to manage construction documents.
Building Information Modelling	The sharing and leveraging of structured information over the building lifecycle.
Civil3D	Civil 3D is a civil infrastructure design and documentation software solution.
Clash Detection	Identifying if, where or how two parts of the building interfere with one another.
Clashes	Result of two elements in a design model taking up the same space.
Common Data Environment	A single source of information for any given project, used to collect, manage, and disseminate all relevant approved project documents for multi-disciplinary teams in a managed process
Digital Engineering Execution Plan	A formal document that defines how a project will be executed, monitored, and controlled with regard to Digital Engineering. A DEXP is developed at project initiation to provide a master information management plan and specifies roles and

Terms	Definitions
	responsibilities for model creation and information integration throughout the project.
DWFx File	Formatted representation of a 2D/3D drawing containing graphics and texts.
Federated Models	A combined building information model containing multiple discipline models.
Information requirements	Specification for what, when how and for whom information is to be produced.
Level of Development	A scale used to describe the level of completeness to which a model element can be relied on at different times during model development.
Model Element	A 3D object
Model Element Author	Ensures the model develops and is coordinated according to project requirements.
Navisworks	A 3D design review software used to open and combine 3D models.
Plant3D	An Autodesk application targeted to the design and layout of process plant facilities. It has the tools and features designers need to create detailed plant models.
Point Cloud Data	Data provided by laser technology which a building is scanned, and information is shown in the form of dots.
Project Information Requirement	Information requirements in relation to the delivery of an asset.
Reality Capture	Software for creating models out of photographs or laser scans without seams.
Revit	A building Information Modelling software used to coordinate data inputs and produce federated project deliverables.
Revit Control Model	Contains survey information for projects. All other disciplines base their models on this.
Revizto	A cloud based visual collaboration software to communicate their design within the project team in a 3D environment.
Topography Information	Description and information on land forms and features.

13.1 Acronyms

Table 21 - Acronyms

Acronyms	Definitions
ACC	Autodesk Construction Cloud
AIMS	Asset Information Management System
BEP	BIM Execution Plan
BIM	Building Information Modelling
CAD	Computer-Aided Design
CBI	Co-ordinated Building Information

Acronyms	Definitions
CDE	Common Data Environment
CP	Construction Partner
DDP	Design and Delivery Partner
SPP	Strategic and Planning Partner
DE	Digital Engineering
DEXP	Digital Engineering Execution Plan
GIS	Geographic Information System
LOD	Level of Development
MDD	Model Description Document
MEA	Model Element Author
WSL	Watercare Services Limited

Appendix I: Asset Creation Sheet

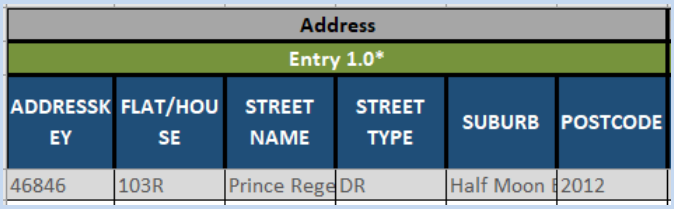
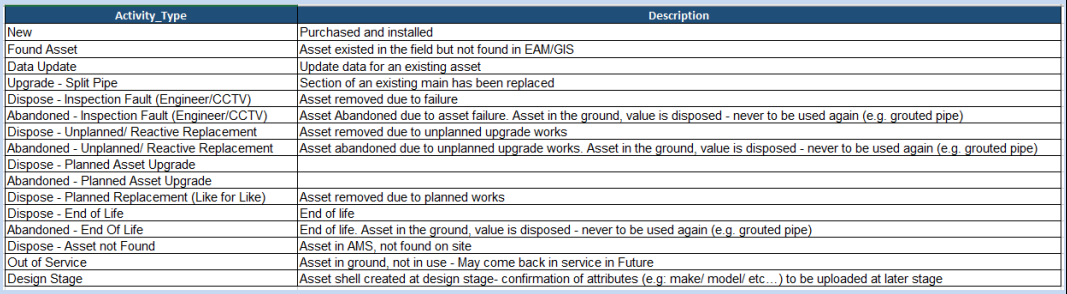
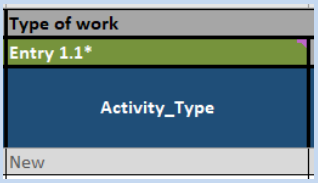
Watercare Asset Creation Sheet to be utilised for asset data capturing and handover of asset information to the Watercare Asset Management team. Steps below to take place for development of the Asset Creation Sheet for each project:

STEP 1

Watercare Project Manager to share the latest version of the Asset Creation Sheet template with the DDP Digital Engineering Manager and DDP Design Leads.

STEP 2

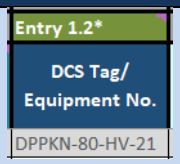
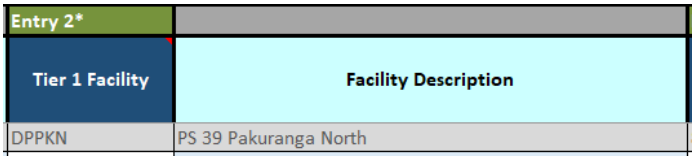
DDP Digital Engineering Manager and DDP Design Leads to create the first draft of Asset Creation Sheet when design almost completed and at the final stages of the Detailed Design phase. The below information to be populated with DDP Digital Engineering Manager and DDP Design Leads:

Step	Instruction
2.a.	**Entry 1:** Add Address
2.a.i.	Details of the address to be confirmed by the Watercare Project Manager, *example*: 
2.b.	**Entry 1.1:** Complete the *Activity_Type*
2.b.i.	Select *Activity Type* from dropdown list in the Asset Creation Sheet, *example:* 
2.b.ii.	For *Disposal*, select *Disposal* and the reason for disposal in the dropdown list
2.b.iii.	For capital project shell creation select Design Stage from the dropdown list, e*xample:* 
2.c.	**Entry 1.2:** Add DCS Tag/ Equipment No.
2.c.i.	Tag Number can be extracted from P&IDs and Drawings, *example:*

Address					
Entry 1.0*					
ADDRESSKEY	FLAT/HOUSE	STREET NAME	STREET TYPE	SUBURB	POSTCODE
46846	103R	Prince Rege	DR	Half Moon B	2012

Activity_Type	Description
New	Purchased and installed
Found Asset	Asset existed in the field but not found in EAM/GIS
Data Update	Update data for an existing asset
Upgrade - Split Pipe	Section of an existing main has been replaced
Dispose - Inspection Fault (Engineer/CCTV)	Asset removed due to failure
Abandoned - Inspection Fault (Engineer/CCTV)	Asset Abandoned due to asset failure. Asset in the ground, value is disposed - never to be used again (e.g. grouted pipe)
Dispose - Unplanned/ Reactive Replacement	Asset removed due to unplanned upgrade works
Abandoned - Unplanned/ Reactive Replacement	Asset abandoned due to unplanned upgrade works. Asset in the ground, value is disposed - never to be used again (e.g. grouted pipe)
Dispose - Planned Asset Upgrade	
Abandoned - Planned Asset Upgrade	
Dispose - Planned Replacement (Like for Like)	Asset removed due to planned works
Dispose - End of Life	End of life
Abandoned - End Of Life	End of life. Asset in the ground, value is disposed - never to be used again (e.g. grouted pipe)
Dispose - Asset not Found	Asset in AMS, not found on site
Out of Service	Asset in ground, not in use - May come back in service in Future
Design Stage	Asset shell created at design stage- confirmation of attributes (e.g. make/ model/ etc…) to be uploaded at later stage

Type of work
Entry 1.1*
Activity_Type
New

Step	Instruction
	
2.d.	**Entry 2:** Complete the Tier 1 Facility (Facility Code)
2.d.i.	Enter a Watercare approved Tier 1 Facility Codes and description from the Facility Tab in the Asset Creation Sheet, example **Facility** / **Description** WMMN2 – Manurewa 2 Watermain DSSPB – Sylvia Park Branch DSDUN – Dunkirk Rd Rising Main
2.d.ii.	If this is a new Facility to be created, Watercare Project Manager need to contact GIS Services to create a Facility Code for the project. Tier 1 Facility needs sign-off from WSL Operation Management team who will be running the assets. Example: 
2.e.	**Entry 3:** Complete T2-Process Description
2.e.i.	Select Process Description from drop down list, you can find Watercare approved Process codes in T2 –Process Tab in the Asset Creation Sheet, *example*: 

Facility Type	Process	Process	Process Description	Sub Area
SD	00 - Site General	Site General	Site General – buildings (civil/electrical/mechanical) and roads etc.	W00
SD	01 - Control Systems	Control Systems	Control Systems (DCS, SCADA, Telemetry RTU's, PLC's etc.)	W01
SD	02 - Electrical	Electrical	Electrical - e.g. DB's, JB's, MCC's, & Field Cabinets (not specifically related to a process/functional area)	W02
SD	03 - Site Services	Site Services	Site Services – e.g. Compressed Air,	W03
SD	05 - Fire & Security	Fire & Security	Fire & Security	W05
SD	06 - IS Network	IS Network	IS Network Management	W06
SD	10 - Screens	Screens	Screens to Raw Water Impoundment and Abstraction (Dam/River Intake)	W10
SD	11 - Dams	Dams	Dams (incl. safety monitoring, etc.)	W11
SD	12 - Aeration	Aeration	Aeration	W12
SD	15 - Compensation	Compensation	Compensation and related equipment. Excludes Weirs	W15
SD	16 - Weir	Weir	Weir	W16
SD	20 - Raw Water	Raw Water	Raw Water	W20
SD	21 - RW Pumping	RW Pumping	Raw Water Pumping & Watermains	W21
SD	22 - RW Line Valve	RW Line Valve	Raw Watermain Line Valving	W22
SD	24 - RW Flow Control	RW Flow Control	Raw Watermain Flow Control	W24
SD	25 - RW Flow Metering	RW Flow Metering	Raw Watermain Flow Metering	W25
SD	26 - RW X Connection	RW X Connection	Raw Watermain Cross-connection	W26
SD	29 - RW Hydro Power	RW Hydro Power	Raw Watermain Hydro Power generation	W29
SD	93 - Bulk Supply Point	Bulk Supply Point	Treated Water Supply Points	W93

2.f.	**Entry 4:** Complete T3 –Sub Process Area Description
2.f.i.	This is only required for large treatment plants with large process areas. **All other assets proceed to Entry 5**
2.f.ii.	Enter applicable Watercare approved District Code, from the T3-Disrict Code Tab in the Asset Creation Sheet

Step	Instruction
2.f.iii.	If a new Tier 3 –District (Sub-process) is required, Watercare Project Manager need to contact GIS Services to create a Process Description for the project. Example:

Entry 4.0*	
T3-Sub Process Area Description	Tier 3 - Sub Process Area (District)

Process		Process Description	System Description	System Code
D00	D00_	Site General	Asbestos Containing Material	ACM
D00	D00_	Site General	Administration	ADMIN
D00	D00_	Site General	Bio Gas	BIOGAS
D00	D00_	Site General	Biosolids	BIOSOL
D00	D00_	Site General	Blower	BLOWER
D00	D00_	Site General	Boiler	BOILER
D00	D00_	Site General	Blended Sludge Thickening	BST
D00	D00_	Site General	Chemically Assisted Sedimentation	CAS
D00	D00_	Site General	Centrifuge	CENFGE

2.g.	**Entry 5** and **Entry 5.1:** Complete Tier 4 –Set and Tier 5-Position
2.g.i.	Tier 4 –Set and Tier 5-Position can be extracted from drawings and P&IDs, example:

Entry 5*	Entry 5.1*
Tier 4 - Set	Tier 5 - Position
PU1	HV21

2.h.	**Entry 6:** Complete Asset Description
2.h.i.	Enter the asset description (Max 200 characters). For Asset Description Guidance, refer to Asset Description Tab in the Asset Creation Sheet, example:

Assets High Level Details	
Entry 6*	
Additional Description	Full Asset Description
Pump 1, Suction Isolation, Gate	VALVE, HAND, PUMP 1, SUCTION ISOLATION, GATE

STEP 3

Depending on the project, asset information can be collected by DDP team from Detailed Design deliverables such as:

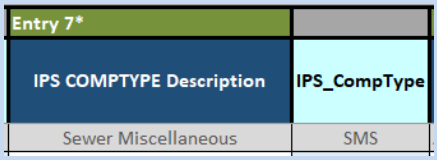
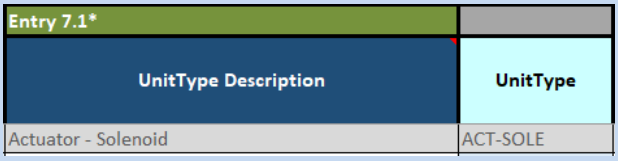
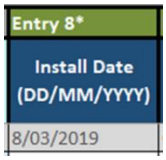
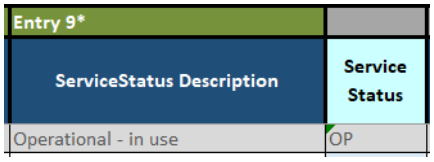
a. IFC version of P&IDs
b. IFC version of drawings and schedules, including but not limited to:
    i. Electrical/Instrumentation – network architecture, single line diagrams, equipment list, cab, motor list, VSD list
    ii. Mechanical drawings – valve list, section plans
    iii. Civil/Structural – site layout
    iv. Piping – pipeline alignment

STEP 4

CP Digital Engineering Manager will be responsible to update the first draft of the Asset Creation Sheet and populate all required asset information after DDP shared the draft document. All information populated by DDP team, need to be reviewed by the CP Digital Engineering Manager after all models, drawings, P&IDs and documents upgraded to As-Built.

STEP 5

The below information to be populated with CP Digital Engineering Manager:

Step	Instruction
5.a.	**Entry 7:** Complete IPS COMPTYPE Description
5.a.i.	Select IPS COMPTYPE Description from the dropdown. This should reflect the GROUP CODE selected in Entry 5 or Entry 5.1, example:  Code | Comptype Description | Code | EffectiveDat | ExpireDat | CompCode | Comment | Description 21 | Sewer Main | 21 | | | SMN | Asset Class | Sewer Main 22 | Sewer Manhole | 22 | | | SMH | Asset Class | Sewer Manhole 24 | Sewer Node | 24 | | | SND | Asset Class | Sewer Nodes 35 | Sewer Valve | 35 | | | SV | Asset Class | Sewer Valve 12 | Water Hydrant | 12 | | | HY | Asset Class | Water Hydrant
5.b.	**Entry 7.1:** Complete UnitType Description
5.b.i.	On selecting an IPS COMPTYPE Description, the UnitType Description dropdown will populate with applicable values. Select applicable description from the dropdown. Example: 
5.c.	**Entry 8:** Complete Install Date, example: 
5.d.	**Entry 9:** Complete Service Status Description
5.d.i.	Select Service Status Description from the dropdown as shown in the table below
5.d.ii	If the Activity_Type was design stage, select Entered in the dropdown
5.d.ii	If the asset is in Operation, select operational –in use in the drop down, example:  Code | Short Description | Description | Code AB | Abandoned | Abandoned - not in use and wont be used by Watercare again | AB DISP | Disposed | Disposed - No longer owned | DISP ENT | Entered | Entered - being created | ENT OP | Operational - in use | Operational - in use | OP OPNV | Operational - not vested | Operational - not vested | OPNV OUT | Not Operational | Not Operational - not in use | OUT
5.e.	**Entry 10:** Complete Criticality Description

Step	Instruction
5.e.i.	Select the applicable Criticality Description from the dropdown as shown on the table below.

Entry 10*	
Criticality Description	Criticality
High	4

Code	Description	Code	Definition	Typical Mainteance Requirement
0	Not Assessed	0	Not assessed	Pending assessment
1	Very Low	1	Negligible	No scheduled maintenance, Run to failure (RTF)
2	Low	2	Reduction in Production	RTF, Planned Preventive Maintenance (PPM), calendar based, hours run
3	Medium	3	Loss of Production	PPM, Condition/Predictive/ Risk Based Maintenance, Design Outs, Critacal Spares
4	High	4	Non-Compliance incident	PPM, Condition/Predictive/ Risk Based Maintenance, Design Outs, Critacal Spares
5	Very High	5	Health & Safety incident	PPM, Condition/Predictive/ Risk Based Maintenance, Design Outs, Critacal Spares

5.f.	**Entry 11** and **Entry 11.1:** Complete Safety Critical Element and Business Area
5.f.i.	Select if this Asset is in a Safety Criticality Element from the dropdown
5.f.ii.	Select the Business Area for the asset from the dropdown
5.f.iii.	The Watercare approved Business Areas can be found under the Business Area Tab in the Asset Creation Sheet. Example:

Entry 11	Entry 11.1*	
Safety Critical Element- *Ardmore Only*	Business Area	Business Area(BA) Code
YES	WW-Transmission-South	DBS

Step	Instruction

Code	Description	Code
CCC	Control-Systems-Hub-Central	CCC
CCE	Control-Systems-Hub-East	CCE
CCN	Control-Systems-Hub-North	CCN
CCS	Control-Systems-Hub-South	CCS
CCW	Control-Systems-Hub-West	CCW
CXC	Control-Repeater-Central	CXC
CXE	Control-Repeater-East	CXE
CXN	Control-Repeater-North	CXN
CXS	Control-Repeater-South	CXS
CXW	Control-Repeater-West	CXW
DBN	WW-Transmission-North	DBN
DBS	WW-Transmission-South	DBS
DN	WW-Network	DN
DNC	WW-Network-Central	DNC
DNE	WW-Network-East	DNE
DNN	WW-Network-North	DNN
DNS	WW-Network-South	DNS

5.g. **Entry 12:** Complete CostCentre (CC)

5.g.i. Select a Watercare approved Cost Centre for the asset that you are capitalising from the CostCentre Tab in the Asset Creation Sheet. Example:

Entry 12*
CostCentre (CC)
4300

Code	Description	Code
1000	Billing	1000
1001	Hardship	1001
1002	Customer Experience	1002
1003	Commercial Accounts	1003
1005	Customer Care	1005
1006	Customer Insights	1006

5.h. **Entry 13:** Complete Material Description

5.h.i. Select a Watercare approved Cost Centre for the asset that you are capitalising from the CostCentre Tab in the Asset Creation Sheet. Example:

Entry 11	Entry 11.1*	
Safety Critical Element- *Ardmore Only*	Business Area	Business Area(BA) Code
YES	WW-Transmission-South	DBS

Step	Instruction

Code	Description
ABS	Acrylonitrile butadiene chloride (ABS)
AC	Asbestos cement (AC)
ALK	Alkathene
ALU	Aluminium
BRA	Brass
CI	Cast iron (CI)
CLS	Concrete lined steel (CLS)
CONC	Concrete
CU	Copper
DI	Ductile iron (DI)

5.i.	**Entry 14:** Complete Asset Specifications / Attributes
5.i.i.	Populate below attributes if applicable to the asset, example:

Assets Specifications / Attributes										
Entry 14										
Manufacturer	ModelNo	SerialNo	Length (m)	Width	Height	Diameter (mm)	Weight	Depth	Elevation	Equipment Capacity

5.j.	**Entry 15:** Complete LN_Projectn Ref
5.j.i.	Enter the LN Project Number associated to the asset. The number to be confirmed by Watercare Project Manager. Example:

Entry 15*
LN_Projectn Ref
WA00001212

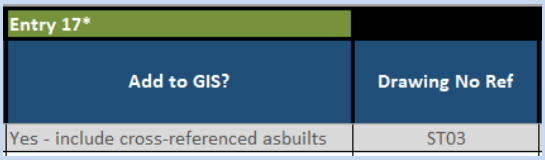
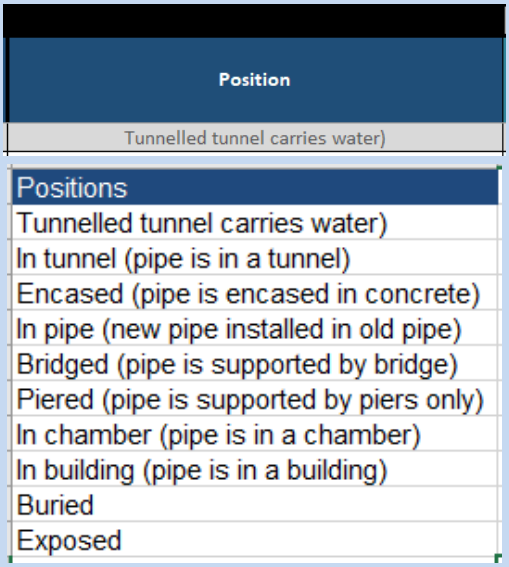
5.k.	**Entry 15.1:** Complete Ownership
5.k.i.	Enter the ownership from the Tab in the Asset Creation Sheet, example:

Ownership
WSL

IPS Code	IPS Description
AC	Auckland Council
OTHER	Other
PVT	Private
WSL	Watercare Services Ltd - (Corporate)
WSL-CM	Watercare Services Ltd - (Comms and Monitoring)
WSL-WS	Watercare Services Ltd - (Water Supply)
WSL-WW	Watercare Services Ltd - (Wastewater)

5.l.	**Entry 16:** Complete Drawing No
5.l.i.	Enter the associated Drawing number, example:

Entry 16
Drawing No
2007761.002

Step	Instruction
5.m.	**Entry 17:** Complete Add to GIS and Drawing No Ref
5.m.i.	Select if the asset needs to be added to GIS from the dropdown
5.m.ii.	If asset needs to be shown on GIS, select Yes to add to GIS. They need to be marked up on the drawings and enter the Drawing No. Reference by using a short phrase as Reference ID. WSL Project Manager to coordinate with WSL GIS team about Entry 17. Add to GIS and Reference IDs to be confirmed by the WSL Project Manager. Example: 
5.n.	**Entry 17.1:** Complete Position
5.n.i.	Select the position from the dropdown, example: 

STEP 6

Depending on the project, asset information can be collected by CP team from IFC and AS-Built deliverables such as:

a. As-Built P&IDs
b. As-Built construction drawings and schedules, including but not limited to:
    i. Electrical/Instrumentation – network architecture, single line diagrams, equipment list, motor list, VSD list
    ii. Mechanical drawings – valve list, section plans
    iii. Civil/Structural – site layout
    iv. Piping – pipeline alignment
    v. Final version of instrumentation and equipment lists
    vi. Construction and fabrication information provided by venders, suppliers, and sub-contractors
    vii. Watercare Operation and Maintenance Manual