



Revizto Guidance Note Version 2

Document Control

Version History

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Final Distribution

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File	-

1 Contents

1	Contents	S	3	
1	Introduc	tion	4	
1	.1 Purpo	se	4	
1	.2 Audie	nce	4	
1	.3 Overv	iew	4	
2	Framew	ork Documents	5	
3	Revizto	Overview	7	
4	Project S	Set Up	7	
4	.1 User M	Management	7	
4	.2 Acces	s Roles and Permission Levels	7	
5	Informat	ion Management	9	
5	.1 Projec	ct and Asset Information Models	9	
5	.2 Revizt	to Coordination	9	
5	.3 File E	xchange Workflow	9	
6	File Mar	nagement	.10	
6	.1 3D Mo	odel Files	.10	
6	.2 2D Dr	awing File Management	.11	
	6.2.1	Folder Structure	.12	
	6.2.2	Dynamic linking of 2d and 3d Overview	.12	
7	Viewpoii	nts	.13	
8	Map Nav	vigation	.14	
9	Issue Tr	acking and Communication	.14	
g	.1 Projec	ct Issue types	.15	
g	.2 Stamp	os	.16	
g	.3 Issue	metadata	.16	
	9.3.1	Issue priority Description	.17	
	9.3.2	Issue Tags	.17	
10	Search S	Sets	.18	
	10.1.1	Search Sets Structure	.18	
11	Propertie	es	.19	
12	2 Appearance Profiler			
13	3 Training & Support			

1 Introduction

1.1 PURPOSE

The purpose of this document is to:

- Guide project teams in the setup, use and ongoing management of Revizto project sites
- Provide guidance on how Revizto is used by KiwiRail for collaboration, communication and coordination throughout the design, construction, and commissioning phases

1.2 AUDIENCE

KiwiRail has implemented Revizto as a platform to democratise information. Because of this the language and terminology used in this document is designed for a wide audience. The document however does describe the use of technical tools within the platform that would be used by different practitioners to varying levels depending on a person's role on the project. Key roles who will engage with Revizto include but are not limited to:

- KiwiRail project team members
- Project delivery team members, including consultants and contractors
- Key stakeholders, for example asset management, operations etc.

1.3 OVERVIEW

Revizto is KiwiRail's chosen digital collaboration platform and is being implemented across capital projects. Revizto adds significant value to KiwiRail capital projects by streamlining design coordination and construction processes, including both formal and informal reviews of information. The Revizto environment represents an aggregation of information and data that will pass through the lifecycle in a tangible form. Issues raised during the design process, including safety in design, will pass through to construction teams. Similarly, the issues raised in construction along with design issues will pass into operations as part of the as-built process, to reduce the likelihood of information and knowledge being lost.

As with the Common Data Environment (CDE) there will be only one master project collaboration environment, Revizto at any one time managing one version of the truth on a project.

KiwiRail requires project delivery team to follow the procedures and guidelines set out in this document.

2 Framework Documents

Version 4 of the DE Framework is segmented into a suite of documents. This enables specific technical information to be covered in a specific document, for the right audience.

The following diagram and table convey the suite of the framework documentation.



Document	Purpose			
Enterprise				
Digital Engineering Framework	To outline KiwiRail's DE vision and overarching objectives.			
	To provide guidance as to where specific detail can be found in other documentation.			
Digital Engineering Information Standard – Part 1 (Management)	Outlines the process of how information is managed and consumed within the context of a project.			
Digital Engineering Information Standard – Part 2 (Technical)	Outlines the details of how information should be produced by an author to meet KiwiRail's information requirements.			
Subsurface Utilities Identification and Modelling Guidance Note	How to identify, model and transmit subsurface utility information to KiwiRail within a project.			
3d Spatial Data Capture Framework	Outlines how spatial information is to be captured, created, reference, and controlled.			
Asset Data Dictionary	Outlines all the possible asset types, and their associated attribution requirements.			
GeoDocs Guidance Note	Supplementary document which covers off the correct usage of the CDE, including details of the background processes for those wanting additional detail.			
Revizto Guidance Note	How KiwiRail standardise the use of Revizto across the KiwiRail projects portfolio.			
Digital Design Management Guidance Note	Outlines how the DE tools & processes of KiwiRail's DE Framework can be embedded within the design phase of a capital project to support & enable design management fundamentals.			
Project				
Digital Engineering Execution Plan (DEXP)	Outlines how Digital Engineering will be completed throughout the scope of the engagement, responding to the requirements outlined in the EIR.			
	Outlines the roles and responsibilities within the supplier's organisation and can be used as a form of assessment for the tender submission process.			
	Pre-contract is to be prepared by the supplier, and the post-contract is collaboratively developed between KiwiRail, its partners and the supplier.			
Project Information Protocol	Provides additional clauses which enable the scope of Digital Engineering to be amended to the contract.			
Information Delivery Schedule	Details the level of information need, required against asset data dictionary classifications, throughout the project lifecycle.			
	Specifies the types of asset classifications expected throughout the scope of the project.			
Project Information Requirements (PIR)	Includes general project information, including scope, stakeholders and high-level delivery milestones.			
	Outline the overarching project specific digital initiatives for implementation on the project.			
	PIR explain the information needed to answer or inform high-level strategic objectives within the appointing party in relation to a particular built asset project. PIR are identified from both the project management process and the asset management process. (extract from ISO)			
Exchange Information Requirements (EIR)	Breaks down the overarching project objectives in the Project Information Requirements into the requirements of each engagement within a project at a detailed level.			
	Details the expectations of information delivery against the project milestones.			
	EIR set out managerial, commercial, and technical aspects of producing project information. The managerial and commercial aspects should include the information standard and the production methods and procedures to be implemented by the delivery team. (extract from ISO)			

3 Revizto Overview

Revizto is a cloud-based visual collaboration software which allows the project team to manage project issues, and to continuously share and communicate the Information Model including the 3D models and 2D drawing files throughout the project lifecycle.

Revizto is divided into three collaboration working spaces that are interconnected:

- 2D Environment This is where the project team review 2D drawing files and communicate issues and/or design enquiries.
- 3D Environment This is where the project team navigate through the 3D design models, review, and communicate issues and/or design enquiries
- Issue Tracker This is where all the project issues are managed and can be configured with specific Information about a particular issue.



4 Project Set Up

KiwiRail will be responsible for the configuration, establishment, and management of a Revizto project site, unless agreed otherwise within the projects Exchange Information Requirements (EIR).

This section outlines Revizto licence management, access roles and permission levels.

4.1 USER MANAGEMENT

Licences can be provided by KiwiRail and should not be considered as a barrier to the successful implementation of project's collaboration environment.

The supplier is to identify the names and email addresses of users that will access the collaboration environment, as well as which of these users do not already hold a licence and require one to be issued to them.

4.2 ACCESS ROLES AND PERMISSION LEVELS

The following table outlines the access permission levels defined in Revizto for different project roles.

Roles	Project Team	Access Role	Permission level
Digital Engineering Specialists	Appointing Party (KiwiRail)	Administrator	Full permission to enable project setup and administration
Project managers	Appointing Party (KiwiRail)	KR Owner	 Issue Tracker Review, create, modify, and comment on issues Close issues Create and apply tags Export Export sheets to PDF Export EXE & IFC Model Content Add/edit viewpoints
Project Information Manager / DE Leads	Lead appointed Party Or Appointed Party (Delivery team)	KR Editor	 Issue Tracker Review, create, modify, and comment on issues Create and apply tags Export Export sheets to PDF Export EXE & IFC Revizto 5 Manage shared search sets Manage shared favourite properties Manage and assign custom properties Manage shared appearance templates Model Content Add/edit viewpoints Edit & append 2d and 3d
Engineers, Architects, Designers	Appointed Party (Delivery team)	KR Collaborator	 Issue Tracker Review, create, modify, and comment on issues Export Export sheets to PDF Export EXE & IFC Model Content Add/edit viewpoints
Project stakeholders	External to project delivery	KR Viewer	Issue Tracker • View issues Export • Export sheets to PDF

Note: The licence information for each project team member, can be accessed through the Revizto workspace, ws.revizto.com.

- Login at Revizto workspace
 Select your License, then select 'License info' from the "Tools" drop down list

5 Information Management

5.1 PROJECT AND ASSET INFORMATION MODELS

As outlined in the DE Framework there are two types of information models created during the asset delivery phase, being the Project and Asset information models. The term model in this case refers to 3D geometric representations, as well as attributes, and documentation.

Revizto is a fundamental tool used to develop the Project Information Model (PIM) and the Asset Information Model (AIM). PIM and AIM information will be stored in the project's CDE and coordinated in Revizto.

5.2 REVIZTO COORDINATION

Revizto democratises project information that is often only available to practitioners with specialised authoring software. This enables graphical information both 3D and 2D to be used live in coordination workshops and meetings with issues raised tagged directly to a visual representation.

Coordination completed in Revizto shall include but is not limited to the following areas:

- General design coordination
- Clash detection
- Safety in Design (SiD) workshops
- Design reviews
- Inter-Disciplinary Coordination workshops
- Constructability reviews

5.3 FILE EXCHANGE WORKFLOW

The below diagram illustrates the required file exchange workflow structure for sharing Information through the collaboration environment, Revizto. During the design process, the PIM is required to be initially uploaded to the CDE, GeoDocs on the agreed date and frequency, and prior to sharing the data in Revizto. This is to allow KiwiRail to review and approve the received information prior to sharing the data with the wider project team.



Project Information Model

To enable efficiencies, and where appropriate, tasks teams may share information directly into Revizto from their authoring software, such as Revit or Civil3D. If this workflow is adopted on a project, all information must be uploaded to GeoDocs at agreed milestones prior to direct sharing in Revizto.



6 File Management

6.1 3D MODEL FILES

The Revizto 3D environment allows the project team to share, review and communicate the 3D model files throughout the design and construction process.

All information pushed to Revizto must first be transitioned into the Shared status within the KiwiRail CDE (GeoDocs), along with a register on the agreed date and frequency. The register shall include:

- The model information suitability (e.g. S2 for information, S4 for review)
- Short summary of major changes made since the last revision in a bullet point format

The latest model files which are uploaded to Revizto can be found through the Object Tree dialog in the Revizto 3D environment as shown in figure 2. For model federation strategy and file naming convention standard, refer to the Digital Engineering Information Standard, Part 2 and the project Digital Engineering Execution Plan (DEXP).



Figure 2: Revizto 3D Environment – Object Tree

6.2 2D DRAWING FILE MANAGEMENT

All drawings are to be uploaded to the project Revizto environment in PDF format, with the exception of drawings authored within a software where 2d drawings can be dynamically linked to the 3d model, which is outlined in Section 6.2.1 below. All PDF files should be sourced from the project CDE, GeoDocs and manually uploaded to Revizto. In future this manual process will be replaced with native integration between the Revizto and CDE (SharePoint), allowing to automatic upload and version control.

As we continue to work under a manual workflow, the following steps should be taken to ensure that PDF files uploaded to Revizto are completed in a way that allows the retention of drawing intelligence:

1. Following download of PDF from the CDE, drawings shall be renamed in the following structure, preferably using automation extracted from the drawing title block.

DRAWING NUMBER - DRAWING TITLE [REVISION]

E.G. 811300-KR-CV-MA70-M2-0001 – GENERAL ARRANGEMENT [P01]

2. Upon upload, the uploader should ensure that all drawings within the upload set are correctly being detected, as any new revisions of drawings will automatically connect.

When drawings are uploaded with the correct file name, the following intelligence of the drawing can be retained:

- Any new drawing with the same drawing number as an existing drawing will be superseded.
- Any issues or markups from the superseded drawing will remain with the new drawing version.
- Facilitates the function of the drawing comparison tool.
- Any geospatial/model overlay positioning will remain.
- Supports improved searching functionality.

6.2.1 Folder Structure

The 2D drawings exported to Revizto, must be organized, and allocated in an appropriate folder. An example of this is illustrated in figure 3.



Figure 3: Revizto 2D Environment - Drawing folder structure

6.2.2 Dynamic linking of 2d and 3d Overview

Where the model authoring software allows it, the dynamic linking of 2d and 3d information should be utilised in Revizto. This enables greater coordination and transparency in the reliability of information used (both 2D and 3D) in construction.

The below diagram conveys the link between the environments.



Figure 4: 2D overlay on 3D model

During the design phase of a project, models are updated in Revizto at an agreed frequency (typically fortnightly) however drawing deliverables are completed at the end of a design phase. To keep a dynamic a connection between the iterative model updates and the static drawings the following workflow has been developed.

 Coordinate only export – Drawings sheets are exported from the model authoring software to Revizto enabling the "export sheet coordinates only function". This will push blank drawing sheets to Revizto however they will have the coordinates and positioning embedded into the sheet.

- **Export to PDF** Drawings are to be exported from the model as PDFs following the naming convention outlined in 6.2. Drawings are to be uploaded to Revizto as per section 6.2. The PDF drawings will replace the empty sheets created from the coordinate only export.
- **Federated model updates** The models can be uploaded iteratively as per the agreed frequency and the static drawings will link to the 3D model as shown in figure 4.

It should be noted that this is a new process to the industry and the workflow might vary depending on the model authoring software used. The KiwiRail Digital Engineering team will support where the workflow requires more / or different steps to enable the 2D and 3D dynamic link.

7 Viewpoints

Viewpoints are used to direct teams to points of interest within the 3D environment. These can be configured within a folder structure, and for KiwiRail projects the following viewpoint structure will be implemented:

Туре	Title	Description
\bigcirc	Home	The home view for the whole project.
	Chainage	This folder will contain viewpoints looking up the alignment (with 0km beind) for each km along the alignment. Where a project contains multiple lines (or alignments) then subfolders will be used to identify the line (e.g NIMT). Projects without alignment data may exclude this folder (e.g. vertical building projects). Creation and management of viewpoints within this folder will be the responsibility of the KiwiRail DE Team.
	Stations	This folder will contain viewpoints for each railway station along a linear alignment. As with chainage this may contain a nested folder structure to identify different lines. Creation and management of viewpoints within this folder will be the responsibility of the KiwiRail DE Team.
	Task Team [n]	These folders will be assigned based on the task team configuration from the CDE. Creation and management of viewpoints within this folder will be the responsibility of the task team members.For large/complex projects with multiple delivery and task teams this folder structure may be nested. The decision for this will be made in agreement with the KiwiRail digital engineering team.
Ë	Signal sighting	Where main line alignment work is included in the project scope this folder will include viewpoints for signal sighting to each signal head. Viewpoints will be positioned by the design team, in consultation with the signals engineer, based on the line speed.

0	Existing State	This viewpoint will feature all existing condition data (e.g. underground services, point clouds, photogrammetry models) and will provide a view of the project site in its pre-project state, with all other data hidden from view. Creation and management this viewpoint will be the responsibility of the KiwiRail DE Team.
0	Current State	This viewpoint will feature as-constructed geometric data provided during monthly "as-built" data drops, with all other data hidden from view. It is intended to give the most up to date representation of the project. Creation and management this viewpoint will be the responsibility of the KiwiRail DE Team.
0	Future State	This viewpoint will feature design models, and other geometric data that will remain/exist on completion of the project, with all other data hidden from view. Creation and management this viewpoint will be the responsibility of the KiwiRail DE Team.

An additional benefit of viewpoints is to allow the application of the appearance profiler. At the time of writing KiwiRail was not utilising the appearance profiler across its projects. It is envisaged that this tool will be utilised to tailor the presentation of information to KiwiRail's engineering disciplines (e.g. Track, Structures, Traction, Signals, Civil, etc) and once a suitable approach has been developed this document will be updated to reflect these requirements.

8 Map Navigation

Map tool in Revizto enables users to navigate through the project from a bird's eye view making it easier to understand where they are within the model. From this view users can double click to be teleported to an alternative location. The map tool also allows users to view the 3d environment from different 'levels' which are traditionally based on floor levels within a building.

The map tool can be accessed from the toolbar in the 3D view, as well as within the mark-up view in the issue tracker.

In order to maximise the functionality of this tool model authors must ensure that rooms and girds are exported to Revizto from the authoring file (where applicable) as illustrated in figure 7.

Export to Revizto	-		\times
Export Options			
Export 3D model (select view)		~
Viewpoints	Textures		
Grids	Rooms	>	
✓ Areas			
Point cloud Hi	gh Quality (6 mm)		×.
Export Sheets	elect sheets		



9 Issue Tracking and Communication

The issue tracker environment within Revizto is the single source of truth for all coordination issues identified on a project. Issues are identified in either the 2D or 3D environment. Metadata is then assigned to the issue. This enables a data driven approach to managing coordination on the project. With a consistent approach to how metadata is applied KiwiRail are able to draw insights into the state of the project, and across its portfolio, at a given time.

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Save Filter Q. So	ieptember 13, 2021	Color
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Figure 4: Revizto Issue Tracking Environment

Issue Filtering – This allows you to filter issues within different meta data fields, for example by stamp, by tag etc.

Chat – This contains all comments made against an issue by different project members and can be considered the golden thread for the issue.

Issue Metadata – This contains the meta data associated to the issue as outlined in section 9.3

Minimise / Maximise - This enables you to minimise / maximise all of the issue tracking tabs

9.1 PROJECT ISSUE TYPES

An issue can be created in Revizto for anything a project team member needs to coordinate, communicate, or collaborate with another project member. The word issue can often have a negative connotation associated with it, however in the context of collaboration environments on KiwiRail projects it should be thought of as an important topic or problem for debate or discussion that needs to be resolved.

At a high level there are two key types of issues that should be generated within Revizto, these are:

- Clash detection issues: These are issue created in clash detection software (for example Navisworks) which are then pushed to Revizto and assigned to design leads for resolution. These are ruled based clashes, for example sleepers v underground utilities and can be both hard clashes or clearance checks as outlined in the KiwiRail Information Standard Part 2 and the projects Digital Engineering Execution Plan (DEXP).
- All other issues: These are issues created directly in Revizto and can be for any number of reasons but ultimately require something to be coordinated or communicated with another team member in a collaborative way. Examples of this include:
 - A team member is looking through the model and notices a design element that will not practically in the onsite context. The project team member will create an issue at in the model and assign it to the appropriate team member they need to coordinate with and add the metadata to the issue.

Revizto is used in a safety in design (SiD) workshop to provide visual context of the project.
 SiD risks are recorded as issues in Revizto during the workshop to be resolved at a future date.

9.2 STAMPS

There are two ways in which an issue can be raised in Revizto, either by "creating an issue" or by "placing a stamp". All KiwiRail projects are configured to prevent plain issues from being created and regardless of the tool used within the software to create the issue you are required to select a stamp when creating an issue.

Stamps are prefilled issues with three/two-letter prefix visible both in the 3D and 2D Environment. The intent of using stamps is to create efficiencies and streamline the project team communication workflows.

Stamps are created and managed by Kiwirail Digital Engineering team. The below table illustrates a set of pre-defined stamps which will be included in Revizto project site prior to initiating the design collaboration process.

Stamp category	Stamp Label	Description
Disciplines (assigned to discipline	(XX)	Two letter prefix discipline code as per
leau)	<u> </u>	
Health, Safety and Environment		Three letter prefix. Includes safety issues
(HSE)		E.g. Safety In Design (SID),
		Three letter prefix, Includes estimating
Estimating		quarries e.g. Traffic/Transport query
<u> </u>	(XXX)	(ETE)
	\bigcirc	Three letter prefix, Includes DE queries
Digital Engineering	(XXX)	and modelling issues

Creating stamps enable the project team to filter through stamps in different categories through the Revizto issue tracker, in order to prioritize or look for a particular issue.

9.3 ISSUE METADATA

When creating or exporting issues to Revizto, the following information about each of the issues reported within the issue tracking environment, must contain the following information, as a minimum:

- Issue title. This is automatically generated from the issue stamp used to create the issue (for issue stamp description, however where possible it should be updated to a title that provides more context of the issue refer section 9.1.2)
- Issue status Open, In-progress or closed issues
- Issue Priority Blocker, Major, Minor or Trivial (Refer to section 9.2.1 for issue priority description)
- Who is responsible for the issue? (Issue assignee)
- Who is the reporter of the issue, and the date the issue was created? Note: This information is automatically generated
- The issue watchers. People who need to track the issue
- Issue tags, to organise and address specific issues.
- Weather it is a public or private issue.

ID 6		
Color	Edit	
Status	Edit	
In Progress		
Abbreviation CV	Edit	
Title	Edit	
This is the title		
Priority Critical	Edit	
Deadline None	Edit	
Created 19/Mar/2021		
Assignee Andy Lyon	Edit	
Reporter Duncan Sharpe	Edit	
I am watching this	YES	
Watchers 3	Edit	
Andy Lyon, Derek Jannings, Duncan Sharpe		
Public		
Tags 2	Edit	
HSE, SID		

nI.

9.3.1 Issue priority Description

The Issue priority level is defined as per the options outlined in the below table. It is designed to notify the issue assignee, and the issue watchers how urgent a particular issue may be. The response time for the issues raised in Revizto, will be within the timeline set out in the table below, for each issue priority level defined.

Priority Level	Description	Response Time
Blocker 🥝	Issues that are blocking the design and/or construction work and affecting the project critical path.	Within 48 hours
Critical 🚹	Issues that are considered critical to the design and construction process.	Within 1 week
Major 🔨	Issues that are considered important to the design and construction process.	Within 2-3 weeks
Minor 🗸	Issues that, while considered important to the correctness of the model, will generally be changing on a regular basis throughout the design and construction phase. Minor Issues requiring further design input during detailed design will be elevated to Major.	As agreed in alignment with project deliverables
Trivial 🐱	Not important to the design and construction process, but it is required to be resolved.	As agreed in alignment with project deliverables

9.3.2 Issue Tags

Tags are used on KiwiRail projects for two purposes; to allow cross project insights and to provide further filtering of specific issues. Tags can be project and discipline specific and should be assigned to issues when they are created. Where stamps contain pre-defined tags, these must not be modified or removed as these have been set to be consistent across the KiwiRail capital projects portfolio. This consistency allows KiwiRail to create cross project reporting dashboards, for example all safety in design stamps will contain the SiD tag to allow KiwiRail to track the risk profile of this type of issue.

When working in the Revizto Issue tracker, the issue tag enables the project team to communicate and extract specific information from the project by creating a filter around the tag and present in an organized fashion.

Under the issue tracker, the tag tool can be accessed at the centre right of the toolbar, as illustrated in the below snapshot:



Figure 6: Adding tags to a issue

When the tool bar is selected, Revizto will reveal all the custom tags that have been created in the project. Each tag created has the ability to associate itself with several issues in the project and further filter those issues for tracking. For example, if a set of issues in the project collaboration environment is required to be communicated through the coordination meetings and be easily filtered through the list of project issues, a specific tag is created and assigned to those specific issues individually. The naming convention for issue tags shall be logical and consistent with other tags which may exist in the tag tool bar.

This process will create efficiency in communication and allows the project team members to clearly understand the issues and capture an increased value in the conversation.

10 Search Sets

Search sets are a way to group models or model elements into specific categories in the 3D environment. This enables users of all experience levels a simplified way to search and filter models. Users can easily isolate or hide models based on the search set grouping.

Collaborative environments democratise 3D information for a wider project audience and search sets are a key tool within Revizto to enable this. KiwiRail see's search sets as a way enable people to easily navigate and decipher 3D information.

10.1.1 Search Sets Structure

As KiwiRail's Digital Engineering Framework aligns with the ISO19650 Information Management standard, this is considered when structuring search sets in Revizto, and supports a consistent approach to how we manage information across our portfolio of capital projects. This also creates a consistent experience for users both internally and externally who deliver or engage with capital projects KiwiRail delivers.

As a minimum, projects should have a Project Information Model (PIM) folder and an Asset Information Model (AIM) folder. Within the PIM there should also be a Design Intent Model folder and Existing Conditions Model Folder, the AIM will provide search sets for viewing as-built models which are developed on the project. An example of this is shown in Figure 10.

Depending on the size and scale of the project, the need for granularity of different search set folders will differ. This should be agreed in the implementation phase of the project and outlined in the Digital Engineering Execution Plan (DEXP).



Figure 7: 3D Environment - Search Sets breakdown example

11 **Properties**

The 3D object properties dialog in Revizto, as shown in figure 11, allows the project team to select a 3D object and review the information associated with that object within the 3D environment. The delivery team use the property palate to:

- When an object is selected in the 3D environment, search for specific information in that object properties pane
- Generate a search based on property selection
- Add custom properties to object inside the Revizto project and allow those properties to be used for various types of search sets, filtering, data export, etc.
- Create sets of favourite properties with logical and consistent naming convention. These properties are used by everyone who is involved in the project and only need to see the object metadata which are important to them.



Figure 8: Properties

12 Appearance Profiler

The appearance profiler allows the project team to configure and pre-define the appearance of various model elements. As a minimum, this tool is to be used to demonstrate the status of objects (where applicable), such as, whether the object is an existing retained, proposed, or temporary, etc.

13 Training & Support

Training and support will be provided by KiwiRail DE team, to demonstrate the KiwiRail way of working within the Revizto environment. This will enable each project team to leverage the full functionality of the tool, share data and collaborate in an efficient and effective manner.

Additional Kiwirail 'Revizto training materials' can be found through this link for internal users <u>REVIZTO</u> <u>TRAINING (sharepoint.com)</u>.