



Digital Engineering Information Standard
Part 1: Information Management
Version 2

Document Control

Version History

Version Number	Version Date	Summary of Changes	Author
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1.1	13/05/2022	Included reference to new Digital Design Management Guidance Note	N Wagner
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Reviewers' Name

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1 Introduction

1.1 PURPOSE

The Digital Engineering Information Standard (DEIS) outlines the information requirements across KiwiRail's capital projects. The DEIS is an appendix to the overarching DE framework and is split into two discrete parts; so that the documents remain concise and specific to the target audience:

- Part 1: Information Management Methods and Procedures
- Part 2: Information Production Methods and Procedures

Part 1 is focussed on the information management function across the KiwiRail project portfolio, including reference to the enabling technologies such as the Common Data Environment (CDE) and Collaboration Platform (Revizto).

Part 2 then covers the technicalities of producing valuable information to KiwiRail within the context of the project, including the standardisation of how information is produced and transmitted, covering: geometric information (e.g. 2D drawings, 3D models and point cloud information) and non-geometric information (e.g. asset information and documentation).

1.2 AUDIENCE

The language and terminology used within the DEIS is more suited towards project delivery professionals, with Part 1 being developed with the intention of being primarily consumed by those involved in projects from a management perspective, for example:

- Design Managers
- Project Managers
- Information Managers

While Part 1 of the DEIS may be read in isolation, it is recommended that the document is read in conjunction with the overarching DE Framework to better understand the journey that KiwiRail are undertaking.

1.3 SCOPE

The DEIS is to be adopted by all task and delivery teams when managing information within a digital enabled project.

1.4 TERMINOLOGY

This section articulates the 'language' of compliance. The following terms have defined meanings.

- must – describes a legal requirement
- shall – describes mandatory requirements of the standard;
- should – describes non-mandatory, best practice recommendations
- may – describes possible options that are neither mandatory nor best practice.

1.5 TERMS AND DEFINITIONS

For terms and definitions outlined in this document refer to Appendix 1: Terms and Definitions.

1.6 REFERENCES

Part 1 of the DEIS relies upon the information contained within the following:

- DE Tucana Guidance Note
- DE Revizto Guidance Note

In addition to these, it should be recognised that the DEIS: Part 1 forms part of a larger document suite, and may draw reference to other relevant standards, requirements, specifications, or guidelines included in Table 1.

Table 1: Digital Engineering 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.
Asset Information Requirements	Outlines all the possible asset types, and their associated attribution requirements.
Project	
Project Information Protocol	Provides additional clauses which enable the scope of Digital Engineering to be amended to the contract.
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)
Information Delivery Plan (IDP)	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. Outlines an exhaustive list of digital artifacts required for project close out.
Guidance Notes	
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.
Revizto Guidance Note	How KiwiRail standardise the use of Revizto across the KiwiRail projects portfolio.
Tucana Guidance Note	Supplementary document which covers off the correct usage of the CDE, including details of the background processes for those wanting additional detail.
Subsurface Utilities Identification and Modelling Guidance Note	How to identify, model and transmit subsurface utility information to KiwiRail within a project.
Spatial Capture Framework	Outlines how spatial information is to be captured, created, referenced, and controlled.
Resources	
Construction Delivery Matrix (CDM)	Helps to facilitate a discussion between the designers and contractors around which piece of information can be used for pricing and construction setout.
Minimum Data Requirements	Helps to facilitate specifying the minimum asset data requirements for capture during the project’s lifecycle, and who’s responsibility it is to provide this information.

Asset Information Exchange Template	Helps to facilitate the Asset Information Exchange process between suppliers and DE team.
Scan Register	Scan register template to provide KiwiRail with details around the captured scan / survey data.

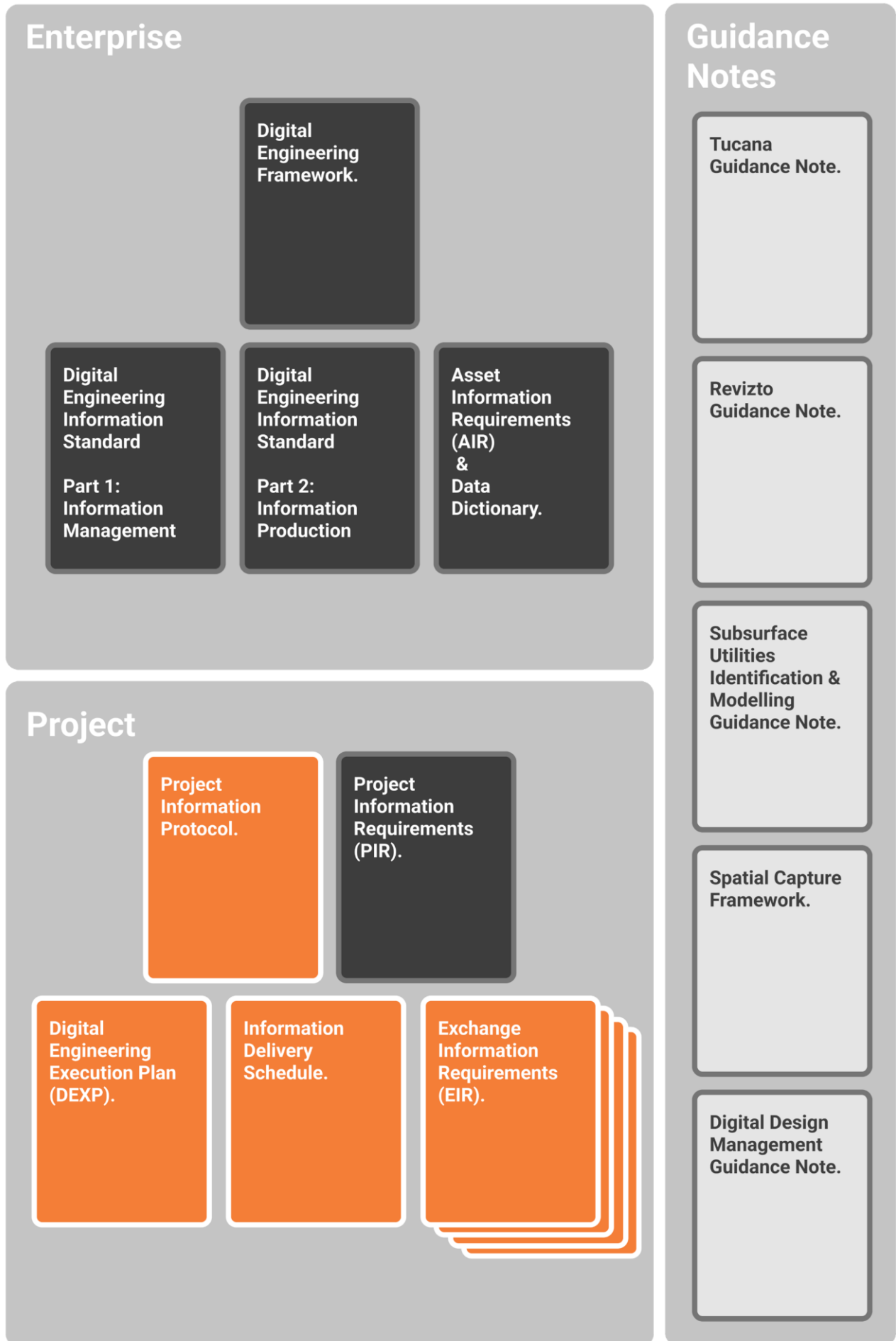


Figure 1: Digital Engineering Document Structure

2 Common Data Environment

2.1 OVERVIEW

To support the digital objectives that are outlined in the DE framework a Common Data Environment (CDE) has been implemented in alignment with the practices defined in ISO 19650.

The CDE provides a digital platform where design models, survey data, and other DE outputs can be hosted and federated across design and construction teams. The CDE will allow KiwiRail to consume and display design material that has traditionally been lost due to a lack of software and licences required to work with multiple specialist file types. Specifically including point clouds and other survey information, design models, and project documentation.

The CDE will be used to control the production and sharing of project information throughout the project lifecycle (both for design coordination and construction updates) and will host the final sets of information (including for construction and Asset Information Models (AIM)). The platform will provide an ongoing repository of capital project information and will provide inputs to organisational Asset Management systems.

2.2 STRUCTURE

The CDE shall contain:

Geometric Information:

- **3D Models** (native, exchange, federated)
- **2D Drawings** (derived from 3D model)
- **Geospatial** (survey, point cloud, terrain)

Non-geometric Information:

- **Asset Information** (schedules, databases, registers etc)
- **Documents** (reports, specifications, contracts, minutes, RFI's, briefs, inspection plans, commissioning certificates, product data sheets, user manuals, etc)

2.3 MODEL FILE NAMING CONVENTION IN CDE

The document naming structure that is created and implemented within the CDE, by the CDE, is outlined below. The revision and document title are held in the (Tucana) Filename metadata field for the relevant document. The original file name for content that has been uploaded to the CDE is retained in the "original filename" element.

Sequence numbers will be automatically created in the CDE. Suppliers will create content using their own naming convention which will be assigned a (Tucana) Filename when its uploaded which consists of the chosen Discipline Code, Document Type Code, and the next available number for that chosen combination.

Note: Suppliers should always reference the Tucana Filename for a document in their own document control record once uploaded. This helps tracking if a file has been uploaded to Tucana and also helps with the superseding of updated files.

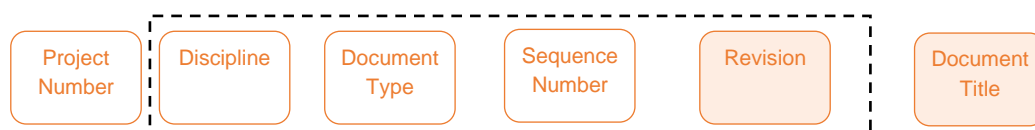


Figure 2 : Document Naming Convention created by the CDE

2.4 SUPPLIER CDE'S

It is recognised that the quality assurance practices of individual suppliers may be at conflict with the WIP principles of BIM. For this reason, it is accepted that suppliers may hold WIP within their own existing CDE systems for internal verification prior to delivering content.

As content is transmitted through to the KiwiRail CDE it shall first land in a task team WIP library and shall then be promoted to Shared content in alignment with the principles of ISO 19650. The below conveys how suppliers can work in their own WIP during the project.

Information that already exists in the CDE shall be superseded/replaced in the WIP library before being re-promoted to Shared.

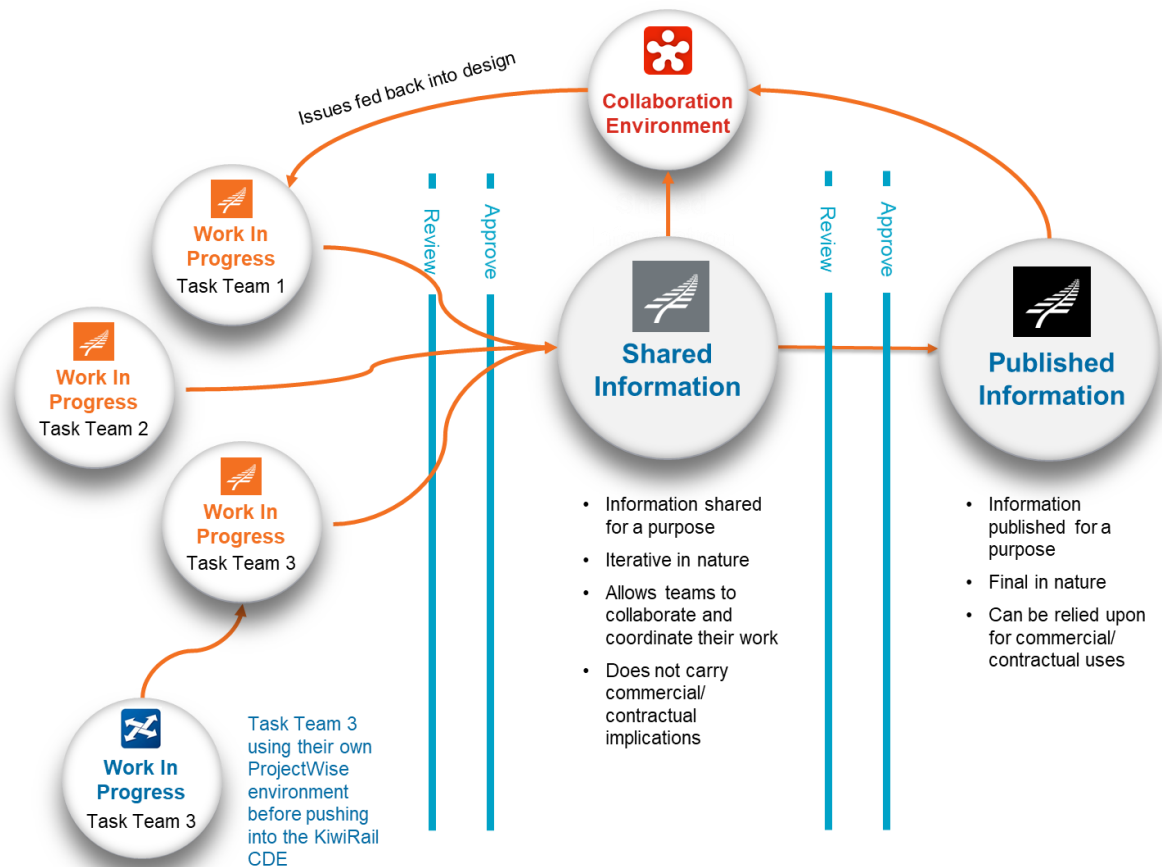


Figure 3: Information Workflow

3 Role Definitions and Responsibilities

This section outlines the key roles that KiwiRail shall recognise within the supplier's DEXP. It should not be taken as a complete list of all personnel to be involved in the digital delivery process, and it is expected that each project or team will tailor roles to suit their objectives and scope.

Roles defined generally fall into project wide and organizational roles therefore the following roles have been identified for each project under the KiwiRail DE Framework:

- DE Manager
- Digital Delivery Lead (Discipline)
- Digital Delivery Engineer - Design
- Digital Delivery Engineer – Construction

3.1 DE MANAGER (OR BIM MANAGER)

The most commonly described role is that of project level DE (more commonly known as the BIM) Manager. The person or persons taking this role can represent the lead designer, the main contractor, and/or a third-party entity acting on behalf of KiwiRail. At this level, the role is responsible for the development and delivery of the DEXP establishing BIM protocols for the project. According to the most common descriptions, quality assurance is also part of the role, as is maintaining oversight of DE responsibilities and deliverables. Guiding the collaborative process, including design review with KiwiRail Engineering Services, is an important aspect of this role, along with organizing DE project meetings and managing project records.

One area of ambiguity regarding the DE Manager role is the degree of authority held by this person. For clarity on KiwiRail CPAD projects, the role of the DE Manager will be responsible for the overall digital delivery of the project, but the Project Manager will be accountable for the successful delivery of the project including digital aspects. It is also expected that the DE Manager will represent the lead designer for each project and will remain central to the digital delivery throughout the project. In this regard, the DE Manager may also fulfil the role of Digital Delivery Lead within their home organization.

3.2 DIGITAL DELIVERY LEAD (DISCIPLINE)

The role is a secondary role under the leadership of the DE Manager and will be required for each individual discipline or supplier within the project framework. Each discipline will appoint a Digital Delivery Lead; the responsibilities of the role include but is not limited to:

- Participate in (or for supplier roles lead) the BIM Execution Planning process
- Participating in design review and model coordination meetings
- Facilitate the use of the BIM Execution Plan within their organization / team
- Ensure model files are developed in accordance with the project BIM Execution Plan
- Validate Levels of Model Development at each project stage
- Perform detailed model audits before issue to the wider team
- Communicate issues to model element authors
- Implement internal coordination and clash detection procedures
- Model transfer and version control

Discipline leads require an overall knowledge of BIM in relation to their discipline. The role will include ensuring that models created within their team adhere to the agreed BIM standards and follow exchange protocols. Model coordination and clash detection will be within the remit of the role; within a project team the Digital Delivery Lead is responsible for leading the coordination activity and ensuring any required propagation of changes resulting from coordination is completed correctly and in a timely manner.

3.3 DIGITAL DELIVERY ENGINEER - DESIGN

This role is intended to perform two functions dependent on the stage in the project lifecycle.

For design activities, this role shall be closely aligned to the role of the Model Element Author, being a project team member who will be developing the Building Information Model throughout the project delivery process. The Model Element Author responsibilities include but are not limited to:

- Modelling elements in accordance with the project DEXP to meet briefed requirements
- Modelling elements at the appropriate Level of Development as defined in the DEXP
- Ensuring design coordination using internal coordination processes as models develop

Other responsibilities for the role include quality control, ensuring that the discipline model conforms to the standards agreed for the project, providing guidelines for the discipline team on agreed project requirements, and communicating data transfer needs and processes with other disciplines.

As the project transitions to the construction phase the Digital Delivery Engineer may perform the role of a digital clerk of works to ensure the design intent is carried through the construction phase. This may include on site verification of construction works (MSQA) with specific reference to the digital model, depending on the specific requirements of the project. The intent is to ensure consistency between the lifecycle phases of asset delivery.

3.4 DIGITAL DELIVERY ENGINEER - CONSTRUCTION

This role is envisaged to be fulfilled by a member of the head contractor and will assist the DDL or DEM in developing the design model to a level of definition that will facilitate the construction activities. The role will act as a DE champion within the construction team and shall support the construction manager and site engineers to embrace digital delivery for construction. The role will include:

- Model development in accordance with the DEXP
- Auditing and verifying data captured in the field by other members of the construction team
- Site set out in accordance with the model information

4 Federation Strategy

The collaboration environment (Revizto) is primarily used for model federation and collaboration between project teams, hence it is not necessary to hold an instance of this in the CDE; only the native/exchange files need to be held.

KiwiRail has chosen Revizto+ as its collaboration platform. It is preferred that suppliers conduct their automated clash detection within the Revizto+ platform. If a supplier chooses to use alternative automated clash detection methods, approval from the KiwiRail DE team is necessary. For clash detection conducted on a federated model using proprietary software such as Navisworks, it is essential that the federated model, along with native/exchange files, be stored within the Common Data Environment (CDE).

The federated model will need to be updated on a consistent basis. The cadence for updates (federation and co-ordination) will be recorded in the DEXP for each project but shall not be less than monthly.

5 Collaboration

The collaboration processes are pivotal to the success of any project, and especially so when considering a project delivered under a DE framework.

To ensure success, KiwiRail has adopted two key collaboration areas:

- The CDE aligned to ISO 19650 – **Where we gather information together**
- The use of Revizto as a collaboration environment to enable virtual design & construction (VDC) – **Where we gather people together**

5.1 COMMON DATA ENVIRONMENT

Each project team is required to contribute to and manage the project CDE in alignment with KiwiRail DE documentation. There may be specific requirements for customisation of processes to support individual projects, and the CDE framework provides this through the project configuration tool and metadata customisation options. Such information shall be outlined within the EIR specific to the project or engagement.

Irrespective of configuration there will only be one master Project CDE in operation at any one time managing one version of the truth. KiwiRail recognise that our external project teams may have a greater

familiarity with the information management practice within their organisation, and these practices are not required to follow ISO 19650.

However, it is required that all information shared from the external project team to KiwiRail is completed in accordance with ISO 19650, which the KiwiRail CDE facilitates natively. It is the responsibility of the external project team(s) to understand how their current systems and workflows may interact with the KiwiRail CDE, and this shall be articulated within the pre-contract DEXP.

At the commencement of the engagement of a supplier into the project a DE kick-off must be held to familiarise the team of the principles of this document and the relevant project DEXP, agree roles, responsibilities, and authorities.

5.2 COLLABORATION IN REVIZTO

While the CDE acts as the repository for sharing and storing information, Revizto is used as a VDC tool to enable teams and stakeholders to have meaningful input to the project lifecycle. KiwiRail shall be responsible for configuration, establishment, and management of the project Revizto environment unless EIR dictate otherwise.

As with the CDE there will be only one master project environment at any one time managing one version of the truth, however in the case of Revizto this environment is holding the issues and items (or conversations) that the teams tag within the model or drawings. The source of any geometric data (or model) remains the CDE. It is important for suppliers to recognise that 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 by issuing the Revizto project during procurement. 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.

The Revizto environment is not purely a tool for designers and constructors, other stakeholders may be invited into the environment so they can have a meaningful input at the right time, for example:

- Consenting teams advising areas of importance to allow designers to reduce the impact of the design.
- Operations teams explaining how they work to ensure the solution meets their needs into the future.
- Community engagement teams to facilitate conversations with our neighbours and ensure they better understand how we impact them.

6 Quality Assurance (QA)

6.1 OVERVIEW

Information quality assurance is both a process and an act of management and should ensure user confidence that the information being used has been appropriately reviewed and verified.

6.2 QA PROCESS

KiwiRail requires the project team to establish, implement and maintain quality assurance and quality control processes, procedures, and protocols for their internal practices of DE and information management. These processes and procedures must be documented in the project DEXP. It is the responsibility of the Appointee to ensure that all project information is delivered with the quality required to meet KiwiRail's Information Requirements.

6.3 INVOLVEMENT

The reviewer of information shall be actively and collaboratively engaged in the development of the information. It is expected that reviewers shall be invited to collaborate using the Revizto environment in an

iterative manner, so that the closed and resolved “issues” from Revizto can be appended as evidence to the formal review workflow within the CDE. This approach is only applicable to geometric information.

6.4 CDE APPROVALS

Approval and authorisation are an act of management and should ensure confidence in the level of quality and use of the appropriate information container. It is the responsibility of the approver or authority to ensure all quality assurance processes have been adhered to and the level of quality achieved is appropriate for intended use.

6.4.1 Approve to Share

Approve to Share is a formal approval process that should confirm all the appropriate checks, reviews and verifications have been carried out to assure the information container is suitable for use by parties outside the direct Task Team.

Approve to Share should trigger a deliberate state change of the information container from Work in Progress to Shared and set the appropriate level of use (suitability) of the information container.

The approval should be performed by an Approver appointed by the Project Manager prior to undertaking approvals. An Approver should be appropriately competent who may be:

- Supervising the process for delivering the work element.
- Managing at a discipline level and subject to the approval of the appropriate Lead Discipline Engineer (or delegate for the package).
- All information containers to be used outside of the Task Team should be formally approved prior to informal or formal exchange.

At approval, the Approver should review the issues and recommendations of review and verification, assess the appropriate resolution thereof, and determine the level of quality required for the use has been achieved, prior to approving the state transition. This does not require all issues and recommendations to be resolved.

An approval should be supported by evidence that includes the following:

- Approver
- Approved date
- Approved state and allowed use (defined by chosen suitability code)
- Information containers

6.4.2 Authorize to Publish (Appointed Party)

Authorize to Publish is a formal approval process that should confirm all the appropriate checks, reviews and verifications have been carried out to assure the information container is suitable for contractual delivery to parties outside the Delivery team.

Authorize to Publish is an acceptance of an Appointed Party’s legal liability with regards to the contractual delivery of the information container.

Authorize to Publish should trigger a deliberate state change of the information container from Shared to Published.

Authorize to Publish should set the appropriate level of use (suitability) of the information container confirming the level of quality is appropriate at specified point in the as/set life cycle as indicated by the suitability code.

The approval should be performed by an Authoriser appointed by the Project Manager prior to undertaking approvals.

An Authoriser should be appropriately competent who may be:

- Supervising the process for delivering the work element
- Complies with the regulatory requirements as imposed by discipline, asset type, or asset location to accept legal liability.
- All information containers to be used outside of the Delivery Team should be formally approved prior to informal or formal exchange.

At approval, the Authoriser should review the issues and recommendations of review and verification, assess the appropriate resolution thereof, and determine the level of quality required for the use has been achieved, prior to approving the state transition. This does not require all issues and recommendations to be resolved.

An approval should be supported by evidence that includes:

- Authoriser
- Authorisation date
- Authorised State and allowed use (defined by chosen suitability code)
- Information containers

6.4.3 Accept to Publish (Appointing Party)

Accept to Publish is a formal approval process that should confirm all the appropriate checks, reviews and verifications have been carried out to assure the information container is suitable for contractual delivery to the Appointing Party or other parties outside the Delivery Team.

Accept to Publish is an acceptance of a Project's legal liability with regards to the contractual delivery of the information container.

Accept to Publish should trigger a deliberate state change of the information container from Shared to Published.

Accept to Publish should set the appropriate level of use (suitability) of the information container confirming the level of quality is appropriate at specified point in the as/set life cycle as indicated by the suitability code.

The approval should be performed by an Acceptor appointed by the Project Manager prior to undertaking approvals.

An Acceptor should be appropriately competent:

- May be supervising the process for delivering the work element
- Complies with the regulatory requirements as imposed by discipline, asset type, or asset location to accept legal liability.
- All information containers to be used outside of the Delivery Team should be formally approved prior to informal or formal exchange.

At approval, the Authority should review the issues and recommendations of review and verification, assess the appropriate resolution thereof, and determine the level of quality required for the use has been achieved, prior to approving the state transition. This does not require all issues and recommendations to be resolved.

An approval should be supported by evidence that includes:

- Acceptor

- Acceptance date
- Approved State and allowed use (defined by chosen suitability code)
- Information containers

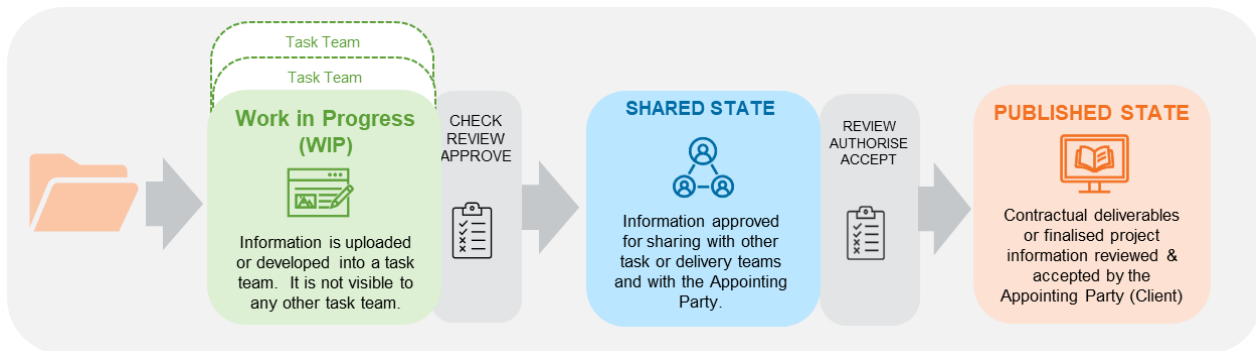


Figure 4 Acceptance workflow

7 Commercial

7.1 SUPPLIER RESPONSES & DEXP DEVELOPMENT

7.1.1 Pre-contract DEXP

Pre-contract DEXP requirements shall be articulated on a per-engagement basis and contained within the PIR and EIR.

7.1.2 Post-contract DEXP

The post-contract DEXP will demonstrate the quality assurance and criteria of the supplier throughout the project stages with consideration to ISO 19650, with the specific content developed in collaboration with KiwiRail and other project partners.

7.2 INFORMATION EXCHANGE FREQUENCY

Unless otherwise stated in the project EIR, appointed parties are to align with the following timing for data drops and model federation as a minimum:

- **Project Information Model**
 - **Concept design** - monthly through development and on final issue
 - **Developed design** - fortnightly through development and on final issue
 - **Detailed design** - fortnightly through development and on final issue
- **Construction Information Model**
 - Completed development of the “for construction” model
 - Monthly as-built updates that conveys physical work that has been completed in alignment with payment claims throughout the construction phase
- **Asset Information Model**
 - Final issue of verified as-built data

The delivery of native model files shall occur at the defined project milestones outlined within the DEXP, or as required throughout the course of the engagement, unless otherwise specified within the EIR.

7.3 DESIGN AUTHORIZING

As part of the DE delivery process, KiwiRail require both the native authoring software format, alongside agreed interoperable file formats. The requested and preferred file formats and authoring tools are outlined in Section 3 of the Information Standard: Part 2.

It should be noted that tools are available within a variety of authoring software, including extensions, which may be used to simplify parts or assemblies within model elements which include detail beyond what has been requested by KiwiRail. An example of this is commonly referred to as Shrink-wrap. Where such tools are being utilised, the author shall discuss this with KiwiRail to ensure data of value is not being lost during the exchange.

7.4 INTELLECTUAL PROPERTY

Unless outlined elsewhere in the Conditions of Contract, or Contract Documents, the following intellectual property conditions will apply:

New Intellectual Property means all intellectual property rights, including (but not limited to) copyright, in all concepts, designs, drawings, specifications, plans, studies, reports, models, software and documentation collated, prepared, or created in any medium by the Lead Appointed Party (or persons appointed by the lead appointed party) in carrying out the Services and provided to the Principal as deliverables but not including Pre-existing Intellectual Property.

Pre-existing Intellectual Property means all intellectual property rights owned by the Lead appointed party or any third party and provided or used by the Lead appointed party in carrying out the Services.

Principal's Intellectual Property means all intellectual property rights owned by the Principal (Appointing Party) and provided to the Appointed Parties for the purposes of carrying out the Services or the Works.

7.5 DATA SECURITY

Unless specifically notified within the EIR, KiwiRail currently do not require additional levels of data security across all DE enabled projects.

7.6 CONTRACT ADMINISTRATION MANAGEMENT & CORRESPONDENCE

Within the CDE is a Transmittals module that has been provisioned to enable contractual correspondence relating to all project appointments within the same environment as for the project deliverables.

The Transmittals module is structured in alignment to the task teams configured in the CDE. In general, the following correspondence types are available:

General Correspondence – intended for non-contractual correspondence that needs to be retained against the project.

Request for Information – intended as a formal request under a contract issued to the Principal or Engineer to Contract.

Contract Advice Notice – intended as a contractual notification generally issued by the Principal or Engineer to Contract.

Document Issue – intended as a transmittal function to simplify the exchange of information.

Non-conformance Report – intended as a format notification relating to non-conforming work.

Notice to Contractor – intended as a formal notification relating to a specific issue, concern or instruction related to the project.

Notice to Engineer – intended as a formal notification relating to a specific issue, concern or instruction related to the project.

7.7 APPENDIX 1: TERMS AND DEFINITIONS

Term(s)	Definitions	ISO 19650 term
Appointed party	<i>Other consultants, sub-consultants to the lead appointed party, who is the provider of information pertaining works, goods, or services.</i>	✓
Appointing party	<i>End client, Asset owner or similar. Receiver of information from appointed party pertaining to works, goods or services.</i>	✓
Asset	<i>Item, thing, or entity that has potential or actual value to an organisation.</i>	✓
Asset information model (AIM)	An Asset Information Model (AIM) is a model that compiles the data and information necessary to support asset management, that is, it provides all the data and information related to, or required for the operation of an asset. – <i>Source NBS</i>	✓
Asset Life cycle	Life of the asset from the definition of its requirements to the termination of its use, covering its conception, development, operation, maintenance support and disposal.	✓
Author/Owner	The person responsible for the content in the information container.	
Building information modelling (BIM)	Use of a shared digital representation of a built asset to facilitate design, construction, and operation to form a reliable basis for decisions Note: BIM is a process for sharing structured information	✓
Classification	Information classifications allow information objects to be grouped for the purpose of common, agreed controls. Examples of controls may include object permissions, workflows, naming etc.	
Common data environment (CDE)	A system that manages the collaborative production, control and exchange of information based on a common standard and agreed access.	✓
Content engine	A content engine is a system designed to manage the production, control, and exchange of project information. Content engines are chosen based on the content they will manage	
Deliverable	Information container contractually agreed to be supplied to the client. The product of engineering and design efforts to be delivered to the client as digital files and / or printed.	
Delivery team	Lead appointed party and their appointed parties. Multi-organizational team working on a part of the project under a lead appointed party	✓
Design Intent Model	A stage of the project information model which demonstrates the early co-ordination of multidisciplinary design elements, including outline specifications and requirements.	✓
Digital Engineering Execution Plan (DEXP)	An agreed set of information to define the projects digital way of working during the delivery phase. The digital engineering execution plan may also be referred to as a BIM Execution Plan, Digital Work Plan, this may be dependent on industry or clients.	
Document	Information (meaningful data) and the medium on which it is contained. Container for persistent information that can be managed and interchanged as a unit. This can represent snap shots from the information model for a specific purpose. This is a synonym to information container	
Document code	A unique code attached to an information container for management purposes. The document code may also be referred to as the Information container code when applied to an information object.	
Information	For the purpose of this standard information is defined as geometric and non-geometric objects or set of objects that forms part of the project information model and ultimately the asset information model.	
Information breakdown structure	A means of grouping information objects by a common purpose. For example, by Work breakdown structure or plant area or facility.	
Information container	A named persistent set of information retrievable from within a file, system, or application storage hierarchy. An information container can refer to a specific information object or a set.	✓

Term(s)	Definitions	ISO 19650 term
Information life cycle	Information on a project goes through several stages starting with the requirements for information to the final archiving of the information after project closure.	
Information object	<p>A specific information container such as a document, geometrical model or piece of data which is produced, received, or referenced during the delivery of the project.</p> <p>This is a synonym to information container</p>	
Information set	<p>A set of information objects grouped for the purpose of information control. This control may include reporting, quality assurance or workflow state change activities.</p> <p>Information sets will be typically applied to define groups of information objects delivered as part of the transmittal process. For example, an engineering work pack containing a number of information objects.</p>	
Issued	<p>An information object, or information package, that is distributed either internally or externally formally via a transmittal. The act of issuing may be carried out for many reasons and is defined by status coding.</p> <p>Typically, information is issued at defined workflow state changes such as Shared and Published.</p>	
Lead appointed party	"Lead consultant", EPC (Engineering, Procurement and Construction) or similar	✓
Master Information Delivery Plan (MIDP)	The MIDP (Master Integrated Deliverable Register) serves as a comprehensive record generated by the supplier It meticulously documents all anticipated deliverables encompassing the entire contract scope and designates responsibility for each. Additional details for each deliverable are also captured, encompassing its document number, design package, and the specified due date	✓
Metadata	Data that describes the information container stored in a common data environment (For example: project number, title, life cycle state, revision, etc.).	
Model deceleration form	A form that highlights key information stating the reason for the model issue, such as the suitability code and a short summary of the changes since the last revision	
Native	Term used for the information objects original file format created by the authoring application. E.g. docx, dwg, dgn, or rvt	
Phase	A point in time of an asset life cycle examples include opportunity, delivery and operational.	
Project	<p>Unique process, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost, and resources.</p> <p>For the purpose of this standard, a project is the full life cycle from initiation project hand back/closeout according to the KiwiRail CPAD Manual.</p>	
Project Information Management	Project Information Management is the application of management techniques and computer software to collect project information, communicate it within and outside the organization, process it to enable managers to make quicker and better decisions and ultimate disposition through archiving or destruction.	
Project information model (PIM)	A Project Information Model (PIM) is a model that compiles the data and information necessary to support design and construction phase of an asset, that is, it provides all the data and information related to, or required for the build of an asset.	✓
Project team	Appointing party and all the delivery teams	✓
Published	<p>An information container is identified as ready for use outside the delivery organization, its actual use is typically defined by status coding clearly defines its allowed use and may enable it to be used to support different life cycle phases.</p> <p>Typically, it will be formally issued to the employer or contractor at this life cycle phase and in a suitable format.</p>	
Rendition	A non-editable version of a native information container, typically a PDF or 3D review format such as Autodesk's Navisworks or Bentley's iModel.	

Term(s)	Definitions	ISO 19650 term
Retention period	<p>A time period applied to records to ensure retention of information to meet legal obligations and support business continuity.</p> <p>Retention periods are governed by the KiwiRail Information Management Policy, KRG-IS008-POL0.</p>	
Revision	<p>A formal label stored on an information container to formally identify it from previous copies of the information container. Typically, revisions are incremented to reflect changes in life cycle states. Revisions may be alpha or numeric characters or a combination of both.</p> <p>Note: Revision numbers within the KiwiRail CDE are alphanumeric (e.g. P01) and are automatically assigned based on review/approval workflows.</p>	
Shared	<p>Once development of a deliverable has reached a suitable point and has been suitably checked, reviewed, verified, and approved, it may be shared outside of the immediate task team.</p> <p>Typically, this is the point at which the design may be translated and made available for cross discipline coordination. The information container may also be issued for external quality assurance review and/or verification processes.</p>	
State	<p>A state represents the different areas of the Common data environment workflow through which information objects transition.</p> <p>The only defined states applied by this standard are Work in Progress, Shared, Published and Archived.</p>	
Status code	<p>A formal label stored on an information container to formally identify the allowed use of the information container in a specific state in the workflow. (This term is contained in ISO 19650 and is also known as a suitability code).</p>	✓
Supplier	<p>Supplier is used as an all-encompassing term for any party contracted to KiwiRail to undertake any form of work, which could include; design (by a design consultancy) or construction (undertaken by a contractor).</p>	
Task Information Management	<p>The management of information sets defined by individual activities or tasks. Each activity has a task information delivery plan (TIDP) which described its information container, format, schedule etc.</p> <p>Task information delivery plans are combined to form a master information delivery plan (MIDP).</p>	
Task team	<p>Individuals assembled to perform a specific task.</p> <p>One or more task teams are appointed by the delivery team.</p> <p>Small projects may define a single task team.</p>	✓
Version	<p>Versioning is a system-controlled copy of the information object to define an auditable history of change.</p>	
Virtual Construction Model	<p>The virtual construction model provides information describing the detailed design, and should be relied upon for construction sequencing, methodologies, and other construction planning, before commencing construction on site.</p>	✓
Work breakdown structure (WBS)	<p>A means of breaking up the delivery of a project scope into packages, typically defined by a hierarchical coding system.</p> <p><i>“deliverable oriented hierarchical decomposition of the work to be executed by the project team.” – PMBOK definition.</i></p>	
Work in progress (WIP)	<p>The first state in a workflow at which effort is applied, ongoing development of a task or deliverable prior to review and approval for share outside the originating task team.</p> <p>Typically work in progress is the only state where an information container can be edited.</p>	✓
Workflow	<p>The automation of a business process, in whole or part, during which information or tasks are passed from one participant to another for action, according to a set of procedural rules, a series of states.</p>	

7.8 APPENDIX 2: DOCUMENT TYPE CODE LIST

Code	Document Type	Code	Document Type
AM	Agenda/Minutes	MN	Manual
AS	Assumption	MO	Memorandum
AU	Audit	MP	Management Plan
BQ	Bill of Quantities	NC	Notice to Contractor
BR	Brief	NE	Notice to Engineer
CA	Calculations	PC	PCG Documents
CD	Credit Summary	PF	PERF
CE	Certificates	PL	Policy
CH	Change Note/Request	PP	Pricing Package
CN	Construction Notes	PR	Process or Procedure
CO	Consents	PS	Presentation
CR	Correspondence	QA	Quality Assurance
CT	Contract	RF	Reference
DA	Design Advice	RG	Register
DD	Design Departure Request	RP	Report
DG	Drawing	RQ	Requirements
DR	Document Review Record	RR	Risk Register
DR	Drawing Register	SH	Schedule (Programme)
DV	Design Verification Record	SK	Sketch
ES	Estimate	SO	Set Out
EV	Evidence	SP	Specification
FM	Form	ST	Standard
FN	Financial	TE	Tender Document
FR	Forecasts	TM	Template
GL	Guideline	TN	Technical Note
IM	Image/Photo/Video	TP	Task Plan
MA	Media	TR	TOR
MD	Model	TS	Transmittal

7.9 APPENDIX 3: DISCIPLINE CODE LIST

Code	Discipline	Code	Discipline
AC	Access Management	IM	Integrated Management Systems
AS	Asset Management	LD	Landscaping
BC	Business Case	ME	Mechanical Engineering
BM	Benefits Management	MP	Mechanical, Electrical and Plumbing
CC	Civil Engineering	OL	Overhead Line Equipment / Traction
CM	Commercial Management	PM	Project Management/Controls
CN	Contractor Management	PR	Procurement
CO	Cost Management	PS	Project Management System
CP	Construction Planning	QS	Quantity Surveying
CS	Communications Systems	RE	Resource Management/Environmental Planning
CS	Communications and Stakeholder	RI	Risk
CT	Construction	RM	Rail Maintenance
DM	Design Management	RQ	Requirements Management
DR	Drainage	RO	Rail Operations
EH	Electrical HV	RS	Rail Systems (general)
EL	Electrical LV	SA	Safety and Systems Assurance
FE	Fire Engineering	SC	Scheduling and Time control
FI	Finance	SM	Stakeholder Management
GE	General Engineering	SI	Signaling
GS	GIS	ST	Structural
GT	Geotechnical Engineering	SV	Survey and Mapping
GV	Governance	SU	Sustainability
HF	Human Factors	TE	Traffic Engineering
HR	Human Resources	TR	Transport, Planning, and Integration
HS	Health, Safety and Environment	TU	Tunnels
		UT	Utilities

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