

Master Specification

Part PC-EDM1

Design Management

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Government of South Australia
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Contents

Contents	3
PC-EDM1 Design Management	4
1 General	4
2 Contractor's design obligations	5
3 Standard of design	5
4 Design provided by the Principal	6
5 Design management	6
6 Design Documentation	10
7 Submission and review of Design Documentation	14
8 Design verification and certification	19
9 Design Departures	20
10 Design certificates	21
11 Construction of the Works	21
12 Construction phase services	22
13 Hold Points and Witness Points	23
14 Appendix 1: Designer's - Certificate of compliance	25
15 Appendix 2: Design process flow charts	26

PC-EDM1 Design Management

1 General

- a) This Master Specification Part specifies the requirements for the design management of road and structural infrastructure including:
 - i) the Contractor's design obligations, set out in section 2;
 - ii) the standard of design requirements, as set out in section 3;
 - iii) obligations regarding designs provided by the Principal, as set out in section 4;
 - iv) requirements for design management, as set out in section 5;
 - v) Design Documentation requirements, as set out in section 6;
 - vi) obligations for submission and review of Design Documentation, as set out in section 7;
 - vii) the design verification and certification requirements, as set out in section 8;
 - viii) the requirements for Design Departures, as set out in section 9;
 - ix) the requirements for design certificates, as set out in section 10;
 - x) the requirements for construction of the Works, as set out in section 11;
 - xi) the requirements for construction phase services, as set out in section 12; and
 - xii) the Hold Point and Witness Point requirements, as set out in section 13.
- b) Design management of rail infrastructure must be managed in accordance with the rail authorities' (e.g. SAPTA, ARTC) requirements.
- c) The Contractor must ensure that the management of design complies with:
 - i) the Reference Documents; and
 - ii) all relevant Laws, including:
 - A. the *Work Health and Safety Act 2012 (SA)*; and
 - B. the *Work Health and Safety Regulations 2012 (SA)*.
- d) Without limiting section 1e), this Master Specification Part applies to Temporary Works where:
 - i) PC-CN4 "Temporary Works" requires those Temporary Works to follow the process set out in this Master Specification Part; or
 - ii) PC-CN4 "Temporary Works" does not form part of the Contract Documents,
(Applicable Temporary Works).
- e) For those elements of Temporary Works that are required to follow the process set out in PC-CN4 "Temporary Works", the requirements of this Master Specification Part still apply where they relate to Temporary Works, including:
 - i) the work breakdown structure for design activities set out in section 5.4;
 - ii) the design program requirements set out in section 5.5;
 - iii) the design progress meetings set out in section 5.6;
 - iv) the design workshops set out in section 5.7;
 - v) the Contractor's review as set out in section 8.2; and
 - vi) the requirements for Design Departures set out in section 9.

- f) For the avoidance of doubt, where PC-CN4 “Temporary Works” does not form part of the Contract Documents, all the requirements of this Master Specification Part apply to the Works and Temporary Works, including the requirements in relation to the Design Basis, Preliminary Design Documentation, Detailed Design Documentation, Final Design Documentation, Issued for Acceptance Design Documentation and Issued for Construction Design Documentation.

2 Contractor’s design obligations

The Contractor acknowledges that:

- a) the development of the design to meet the requirements of the Contract Documents is the sole responsibility of the Contractor;
- b) the Principal has no obligations in respect of the development of the design, except where specified otherwise;
- c) receipt of the Contractor’s Documents by (or on behalf of) the Principal is solely for the purpose of monitoring the performance and progress of the Contractor;
- d) the Principal owes no duty to the Contractor to review or examine any of the Contractor’s Documents submitted by the Contractor for compliance with the requirements of the Contract Documents or any applicable Law; and
- e) despite any review, comment, release of Hold Point and Witness Points, request for change, endorsement, approval, acceptance, or deemed acceptance regarding any Contractors’ Documents by (or on behalf of) the Principal:
 - i) the Contractor is not relieved of its responsibilities and obligations under the Contract Documents; and
 - ii) the Principal has no liability whatsoever to the Contractor by reason of any errors, deficiencies, defects or omissions in any Contractor’s Documents.

3 Standard of design

- a) The Contractor’s Activities must meet the requirements of:
 - i) the Contract Documents, including all Reference Documents, standards, guidelines, and codes referenced therein or otherwise applicable; and
 - ii) any clarifications or interpretations of standards, codes, and guidelines contained within the Contract Documents.
- b) Subject to changes made during the development of the design to ensure compliance with the Contract Documents, the design of the Works and Applicable Temporary Works must be developed in a manner such that each stage of the design is consistent with, and a logical development of, the preceding version(s) of the design including the Tender Design.
- c) The design must not be of a lesser standard (as determined by the Principal) than any preceding version of the design.
- d) Where the design is determined in accordance with section 3c) to be a lesser standard, the Contractor must ensure that the design is not of a lesser standard than the preceding version of the design by:
 - i) updating and amending the relevant design; and
 - ii) resubmitting the relevant design at the same design stage as the previous submission.
- e) Where the Contractor identifies a specified requirement cannot be achieved, it must immediately notify the Independent Design Certifier (where relevant) and the Principal.
- f) The Contractor must provide advice and details of why a requirement cannot be achieved and the proposed alternative design solution(s) for consideration by the Independent Design Certifier (where relevant) and the Principal as part of a Design Departure submission to the

Principal, within 10 Business Days of identification of a specified requirement not being able to be achieved.

4 Design provided by the Principal

- a) If a design has been prepared by the Principal (including a Reference Design, Concept Design, sketch or schematic design), the Contractor acknowledges that the design prepared by the Principal:
 - i) is provided for information only;
 - ii) has been prepared solely for project planning purposes;
 - iii) may not comply with the Contract Documents;
 - iv) has not been reviewed, checked, or optimised; and
 - v) does not form part of the Contract Documents.
- b) The Contractor may not place any reliance on a design prepared by the Principal or any aspect of the design prepared by the Principal.
- c) The use of any aspect of any design prepared by the Principal is entirely at the Contractor's risk.

5 Design management

5.1 General

The Contractor must manage the development of the design to ensure the design achieves the requirements of the Contract Documents.

5.2 Design Management Plan

- a) The Contractor must establish, implement and maintain a Design Management Plan for the management of the engineering and design activities, which as a minimum must include:
 - i) information on the design team, including roles and competencies of personnel;
 - ii) design deliverables;
 - iii) design milestone dates;
 - iv) the decision-making process for significant design decisions, including:
 - A. the criteria and thresholds for identifying significant design decisions that will be subject to multi-criteria assessment;
 - B. the criteria and weightings against which design options are assessed (which must include whole-of-life environmental, economic, social and technical criteria relevant to the decision); and
 - C. endorser(s) and approver(s);
 - v) subject to the requirements of section 5.3, any alternate approach to design management (i.e. departures to this Master Specification Part);
 - vi) management of the design verification and certification processes and interface with the Independent Design Certifier (where relevant);
 - vii) a clear description of how the Observational Method will be applied and certified (where the Observational Method is proposed), including the responsibilities to ensure implementation during the construction phase;
 - viii) the Safety in Design process;

- ix) the process for the capturing, processing, and closing elements identified in the design verification and certification processes;
- x) include a procedure for the approval of Shop Drawings in accordance with section 12.1a)iv), including the co-ordination with construction management requirements in accordance with the Construction Management Plan and PC-CN3 “Construction Management”;
- xi) the process for changes to IFC Design Documentation in accordance with section 7.8; and
- xii) additional requirements for design and construct or alliance projects (as applicable), including:
 - A. interface management of both technical design disciplines, construction activities (including the Designers role in construction quality Hold Points and Witness Points), the Observational Method and Construction Verification (where relevant);
 - B. design program requirements with distinct Design Packages and work breakdown structures (including Gantt chart) integrated into the construction program; and
 - C. management of the Independent Design Certifier.
- b) The Design Management Plan must be prepared, submitted and updated in accordance with PC-PM1 “Project Management and Reporting”.
- c) Commencement of the design must not occur until the Hold Point in relation to the Design Management Plan as set out in PC-PM1 “Project Management and Reporting” has been released.
- d) The Design Management Plan may be integrated with other Project Plans for smaller, less complex projects, subject to the endorsement of the Principal.

5.3 Contractor’s proposed alternative approach

- a) The Contractor may propose an alternative design management approach outside the requirements specified in this Master Specification Part, (e.g. for smaller, less complex projects, or for low-risk elements) and will be subject to the endorsement of the Principal.
- b) The Principal is under no obligation to accept any proposed alternate design management approach.

5.4 Work breakdown structure for design activities

- a) The Contractor must prepare a work breakdown structure which identifies:
 - i) the Design Packages for the individual elements of the Works and Temporary Works;
 - ii) the design disciplines associated with each individual element; and
 - iii) the Independent Design Certification (where relevant) required for each discipline.
- b) The work breakdown structure must be commensurate with the complexity of the Works and Temporary Works and be integrated with the Contract Program.
- c) Provision of a work breakdown structure (including revisions) will constitute a **Witness Point**.
- d) If the work breakdown structure is revised, the revised work breakdown structure must be provided to the Principal and the Independent Design Certifier (where relevant) with a revised Contract Program.

5.5 Design program

- a) The Contract Program for design management must include as a minimum:

- i) the milestone dates for the development and submission of the Preliminary Design Documentation, Detailed Design Documentation, Final Design Documentation, IFA Design Documentation and IFC Design Documentation;
 - ii) the time allowed for review by the Independent Design Certifier (where relevant) and the Principal; and
 - iii) the time allowed for the release of Hold Points and Witness Points.
- b) The Contract Program for design management must be further developed for design and construct and alliance projects (to reflect the increased complexity) including as a minimum the following additional requirements:
 - i) design program (Gantt chart) integrated into the construction program;
 - ii) design activities, which are correlated with the Contractor work breakdown structure for each discrete element of the Works and the Temporary Works;
 - iii) the time allowed for construction and Designer's verification and Road Safety Audits (where applicable);
 - iv) the time allowed for traffic control drawings and traffic signal controller personalities in accordance with sections 7.5.2 and 7.5.3;
 - v) design reviews, including workshops; and
 - vi) float and the critical path of all Design Packages.
- c) The design program must be submitted to the Independent Design Certifier (where relevant) for confirmation that their role is accommodated in the program.
- d) The Contract Program for design management must be submitted to the Principal:
 - i) within 10 Business Days of the Commencement Date for design only projects; or
 - ii) in accordance with PC-PM2 "Contract Program" for all other projects.

5.6 Design progress meetings

- a) Unless otherwise specified in the Contract Documents, design progress meetings must be held fortnightly, to review:
 - i) progress in submitting Design Documentation against the Contract Program;
 - ii) progress of Temporary Works design;
 - iii) an updated 4 week forecast detailing all design activities, including meetings, workshops and Design Documentation submission to assist in scheduling design reviews;
 - iv) an updated 3 month forecast for Design Documentation submission to assist in scheduling design reviews;
 - v) a register of issues affecting design progress and actions to resolve such issues;
 - vi) all requested and approved changes to the Tender Design;
 - vii) all Design Departures; and
 - viii) any other issues arising out of the design.
- b) Design progress meetings must involve representatives from the Principal, the Independent Design Certifier (where relevant), the Contractor and its Designers and any other representative requested by the Principal.

5.7 Design workshops

5.7.1 General

- a) Design workshops may be requested by the Principal, the Contractor, the Designer, or the Independent Design Certifier (where relevant) on an as needed basis at any stage during the design development and review process.
- b) Any workshop requested in accordance with section 5.7.1a) or the Preliminary Design gate review in accordance with section 7.3 must include representatives from the Contractor, the Designer, Principal, the Independent Design Certifier (where relevant), and any person requested by the Principal to:
 - i) informally review the design prior to submission of Design Documentation or Temporary Works design (as applicable) in accordance with section 7;
 - ii) explain any Design Documentation (including the design) or Temporary Works design, including key design decisions;
 - iii) provide such information regarding any Design Documentation or Temporary Works design as the Independent Design Certifier (where relevant) or the Principal reasonably requests; and
 - iv) discuss any comments received on the Design Documentation and Temporary Works design.
- c) For the avoidance of doubt any advice or guidance provided by the Principal in workshops does not constitute a direction to the Contractor.
- d) The initiating party of the workshop must issue:
 - i) a request for the workshop at least 5 Business Days prior to the workshop; and
 - ii) an agenda regarding that workshop at least 3 Business Days prior to the workshop.

5.7.2 Safety in Design

- a) The development and management of the design must be integrated with the Safety in Design requirements detailed in PC-EDM2 "Safety Management in Design".
- b) The initial Safety in Design workshop:
 - i) may be incorporated into the Preliminary Design gate review in accordance with section 7.3; and
 - ii) must not be undertaken later than the Preliminary Design gate review in accordance with section 7.3.

5.7.3 Sustainability in Design

- a) The development and management of the design must be integrated with the Sustainability in Design requirements detailed in PC-ST1 "Sustainability in Design".
- b) The initial Sustainability in Design workshop:
 - i) may be incorporated into the Preliminary Design gate review in accordance with section 7.3; and
 - ii) must not be undertaken later than the Preliminary Design gate review in accordance with section 7.3.

5.7.4 Maintenance in design

- a) A maintenance in design assessment must be undertaken, in conjunction with the Principal's nominated maintenance personnel, to assess the design and resulting (future) maintenance activities to ensure the design provides efficient and safe maintenance access.

- b) The maintenance in design assessment is to be documented and integrated with the O&M Manual and training requirements detailed in PC-CN2 "Asset Handover".
- c) The initial maintenance in design assessment:
 - i) may be incorporated into the Preliminary Design gate review in accordance with section 7.3; and
 - ii) must not be undertaken later than the Preliminary Design gate review in accordance with section 7.3.

6 Design Documentation

6.1 General

- a) The Principal may, in its absolute discretion, advise the Contractor that it is not required to comply with one or more requirements of sections 6.7, 6.8 and 6.9 in respect of the Preliminary Design Documentation, Detailed Design Documentation and Final Design Documentation (as applicable) for a specific Design Package.
- b) The Contractor must, using Best Industry Practice:
 - i) identify and notify in accordance with section 9.1 all Design Departures prior to the relevant Preliminary Design Documentation submission; and
 - ii) obtain approval for each Design Departure in accordance with section 8 prior to the relevant Final Design Documentation submission.

6.2 Design Basis

- a) The Contractor must prepare a summary Design Basis (e.g. tabulated) to define the requirements for each technical discipline related to the Works and Applicable Temporary Works including:
 - i) all Reference Documents and references of the Contract Documents used to define the requirements;
 - ii) material properties, including performance requirements, durability, and Design Life;
 - iii) the site-specific selected design parameters, coefficients, performance standards, or assumptions (etc.) to be adopted;
 - iv) design loads and load combinations;
 - v) any interpretations, clarifications, or assumptions made in relation to the Contract Documents, including land acquisition constraints, environmental constraints, and heritage constraints;
 - vi) information which has been specified in each applicable Master Specification Part to be included in the Design Basis (refer to the section "Documentation" in each Master Specification Part);
 - vii) where the Observational Method is to be utilised, how it will be applied to the project; and
 - viii) the design software to be utilised within the design process,

(Design Basis).
- b) The Design Basis must be submitted to the Independent Design Certifier (where relevant) and the Principal as soon as practical within the design development process, in accordance with Table PC-EDM1 6-1, and as a minimum, prior to commencement of the Preliminary Design Documentation development, which will constitute a **Hold Point**. The development of the Preliminary Design Documentation associated with the Design Basis must not commence until this Hold Point is released.

Table PC-EDM1 6-1 Design Basis Hold Points

Hold Point	Design Basis
Item held	Development of the Preliminary Design Documentation
Submission details	Technical basis of design proposed for the project

6.3 Site assessment

- a) The Contractor must undertake a field inspection of the Site to verify the Site features that would reasonably be apparent during a Site inspection.
- b) The outcome of the site inspection is to be documented in the Design Report at Preliminary Design stage detailing the inspection and any issues identified.

6.4 Design Report

- a) The Contractor must prepare Design Reports for each technical discipline and each Design Package (where applicable).
- b) The level of detail included in the Design Reports must be commensurate with the relevant technical discipline, Design Package and the design stage of the design.
- c) A Design Report is a summary of design work undertaken and must document the following as a minimum:
 - i) the completed Design Basis;
 - ii) the site assessment outcome in accordance with section 6.3;
 - iii) a description of the design development process;
 - iv) key design decisions and benefits of the design decision (i.e. why it was selected), including environmental, economic, and social benefits, having regard to the triple-bottom line assessment process described in the Department Sustainability Manual, Part 9;
 - v) requirements relating to greenhouse gas emission reduction and increasing recycled content and strategies implemented within the design to maximise achievement of the sustainability objectives (refer to PC-ST1 “Sustainability in Design”), including implementation status of any applicable mandatory, Principal nominated and Contractor nominated sustainability initiatives (where applicable);
 - vi) all relevant analysis and calculations for the Works and Applicable Temporary Works;
 - vii) the information which has been specified in each applicable Master Specification Part to be included in the Design Report, including all Design Documentation requirements relevant to the report (refer to the section “Documentation” in each Master Specification Part);
 - viii) a summary of any changes to the design since the previous issue of the Design Report;
 - ix) for all design stages, all Design Departures must be identified including details of the Design Departure and the status;
 - x) a summary of Hold Points and Witness Points released and evidence of any required Approvals; and
 - xi) an outline of the documentation that will be prepared for the operation and maintenance of the Works and processes and procedures for commissioning of the Works,

(Design Report).

6.5 Design Drawings

- a) The Design Drawings are to be in accordance with the Department's standards and guidelines (available from <https://dit.sa.gov.au/standards>).
- b) The Design Drawings must comply with the following:
 - i) the drawing number and title must be in accordance with Department standards and guidelines and the Contract Documents;
 - ii) drawings must only be developed on A1 sheet sizes;
 - iii) CAD files detailed plan view and general arrangement must be based on the survey coordinates' location and scale (i.e. local GDA 2020 and metres);
 - iv) design models must be in a plane coordinate system based on the survey control marks and survey dataset supplied by the Principal;
 - v) drawings must nominate the person who has completed the design and the person who has completed the Independent Design Certification (where relevant); and
 - vi) be in accordance with the information which has been specified in each applicable Master Specification Part to be included in the Design Drawings, including all Design Documentation requirements relevant to the drawings (refer to the section "Documentation" in each Master Specification Part).

6.6 Traffic control and traffic signal Design Documentation

- a) This section 6.6 only applies where traffic control devices and traffic signals will be installed, including for Applicable Temporary Works.
- b) The traffic control and traffic signal Design Documentation and Applicable Temporary Works design documentation must comply with the following requirements:
 - i) Department's Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices;
 - ii) Department Pavement Marking Manual;
 - iii) RD-LM-D1 "Traffic Control Device Design"; and
 - iv) RD-EL-D2 "Traffic Signal Design".
- c) The Contractor must develop and submit a traffic impact statement with the traffic control drawings, including for Applicable Temporary Works.

6.7 Preliminary Design Documentation

The Preliminary Design Documentation must include:

- a) design which has been developed to resolve spatial coordination of the relevant Design Package(s), including geometry and the relationship with adjacent Works and to a level of sufficient detail to demonstrate:
 - i) the major design features and functionality;
 - ii) integration of the individual disciplines within the design and identification of any potential clashes with Utility Services and other constraints; and
 - iii) how the design achieves the specified operational and key project technical requirements;
- b) the Design Report;
- c) the Design Drawings;
- d) a maintenance in design assessment in accordance with section 5.7.4;

- e) a Safety in Design report;
- f) the Sustainability in Design sustainability initiatives register;
- g) evidence of the Contractor's review in accordance with section 8.2;
- h) the initial response to the matters raised by the Independent Design Certifier's review including either how the matter will be addressed in the subsequent design development or how the matter has already been addressed; and
- i) all other requirements of the Design Documentation (as applicable for Preliminary Design Documentation) as set out in the Contract Documents.

6.8 Detailed Design Documentation

The Detailed Design Documentation must include:

- a) all information required by section 6.7, substituting the term 'Preliminary Design' with 'Detailed Design';
- b) all matters raised by all review parties and a response to all matters raised during the Independent Design Certifier review on the relevant Design Documentation submission associated with the Design Package and demonstration of how all matters have been addressed;
- c) where the design includes traffic control devices, the Contractor must submit a traffic impact statement in accordance with RD-LM-D1 "Traffic Control Device Design" and the Department Guideline for the Preparation of a Traffic Impact Statement;
- d) demonstration that the Design Documentation will meet all the requirements of the Contract Documents; and
- e) all other requirements of the Design Documentation as set out in the Contract Documents.

6.9 Final Design Documentation

- a) Final Design Documentation must be complete Design Documentation for construction purposes, prior to obtaining the Independent Design Certificate (where relevant) and the design certificates in accordance with section 10 required for Issued for Acceptance Design Documentation.
- b) The Final Design Documentation must include:
 - i) all information required by section 6.8, in a finalised form, substituting the term 'Detailed Design' with 'Final Design';
 - ii) all matters raised by all review parties and the final resolution to all matters raised on the relevant Design Documentation submission associated with the Design Package and demonstration of how all matters have been addressed; and
 - iii) all other requirements of the Design Documentation as set out in the Contract Documents.

6.10 Issued for Acceptance Design Documentation

The Issued for Acceptance Design Documentation must include:

- a) the Final Design Documentation with any changes as required from the Final Design review process to enable issuing of design certificates in accordance with this section 6.10;
- b) the design certificates in accordance with section 10;
- c) the Independent Design Certificate (where relevant);
- d) where relevant, acceptance from the Department's Network Management Services of the traffic control and traffic signal design documents and drawings;

- e) Accepted Design Departures; and
- f) any relevant written Approvals.

6.11 Issued for Construction Design Documentation

IFC Design Documentation must not differ from the relevant IFA Design Documentation, except:

- a) to address any conditions received by the Principal with the release of a Hold Point as required by section 7.6c), which must include as part of the relevant IFC Design Documentation submission either:
 - i) updated certificates, reports and information (as applicable) to reflect the amended Design Documentation; or
 - ii) where the information required by section 6.11a)i) is not provided, confirmation that any amendments made to the Design Documentation to address the conditions received by the Principal do not impact the previously issued certificates, reports or information (as applicable); or
- b) for changes to IFC Design Documentation in accordance with section 7.8.

6.12 Digital engineering model

- a) If not specified in the Contract Documents, the Contractor is encouraged to develop a digital engineering model that uses intelligent digital design models to:
 - i) enable digital interpolation and review; and
 - ii) satisfy technical handover requirements or asset information requirements that will make up the Asset Information Model.
- b) The development and management of the digital engineering model must be integrated with the design process and meet the requirements of PC-EDM5 “Digital Engineering”.
- c) Where a digital engineering model is to be used as part of the Independent Design Certification process, the Contractor must consult with the Independent Design Certifier on the development and application of that model for that purpose.
- d) Where a Digital Engineering Execution Plan is required by the Contract Documents, the Contractor must not commence development of the design until the Hold Point in relation to the Digital Engineering Execution Plan as set out in PC-PM1 “Project Management and Reporting” has been released.

6.13 Evidence of review

- a) The Contractor must plan and implement procedures to have ownership of, capture, process, and close out comments received from design review for each individual Design Package. These must be logged in evidence of review register, and the Contractor must respond to each individual issue or comment.
- b) The evidence of review register must be updated and submitted at each design submission for each individual Design Package.

7 Submission and review of Design Documentation

7.1 Submission obligations

- a) The Contractor must:
 - i) submit the Design Documentation for each Design Package for review progressively and in a manner that does not result in an unreasonable number of Design Packages being submitted in any given week;

- ii) provide any Design Documentation to the Principal and Independent Design Certifier (where relevant) within 5 Business Days of a request from the Principal to view the current draft of that document; and
 - iii) provide the Principal with Design Documentation associated with each Design Package when that document reaches each design stage.
- b) In addition to the electronic copies (which must include a combined set of drawings in a single PDF file), the Contractor may be requested by the Principal (with reasonable notice) to provide bound paper copies of the Design Documentation (including a minimum of 2 sets of drawings at A3).

7.2 Design reviews

- a) Design Documentation for review must be submitted in Design Packages as detailed within the work breakdown structure (refer to section 5.4).
- b) The Contractor must submit the Design Documentation associated with each Design Package at the specified design stages to the Principal and the Independent Design Certifier (where relevant) in sufficient detail commensurate to the design phase to enable review of the design.
- c) The design review process is summarised in Appendix 2: Design process flow .
- d) The requirements and responsibilities for the Independent Design Certifier (where relevant) are detailed in PC-EDM3 “Independent Design Certification”.
- e) The Contractor must ensure the Independent Design Certifier has completed its review prior to providing the Design Documentation associated with the Design Package to the Principal.
- f) Prior to the submission to the Principal, the Contractor must review the findings of the Independent Design Certifier review and wherever possible, resolve the comments.
- g) Following receipt of the Independent Design Certifier review and the Contractor’s resolution of comments (where possible), the Principal will assess and review the Design Documentation.
- h) At each review, the Principal may:
 - i) permit work to proceed;
 - ii) permit work to proceed, provided that specified changes are implemented by the Contractor; or
 - iii) prohibit work from proceeding until the Design Documentation is revised and re-submitted at the same design stage.

7.3 Preliminary Design

- a) The purpose of the Preliminary Design review is to identify potential deficiencies in the functional or operation performance of the Preliminary Design Documentation prior to the design progressing to Detailed Design and Final Design stages.
- b) For the purpose of Preliminary Design, all Design Departures must be identified and notified in accordance with sections 6.1b) and 9.1.
- c) The Contractor must convene a Preliminary Design gate assessment to review the outcome of the Preliminary Design review including project key stakeholders including:
 - i) Subcontractor Designer consultant(s) (where applicable);
 - ii) the Independent Design Certifier (where relevant); and
 - iii) the Principal’s nominated technical and operational personnel (including road and rail (as applicable)).
- d) The timing of the Preliminary Design gate review is to be agreed with the Principal and must occur prior to the Detailed Design submission and after the Preliminary Design gate assessment.

- e) The Contractor must submit the Preliminary Design Documentation to the Principal in accordance with Table PC-EDM1 7-1 which will constitute a **Hold Point**. The Contractor must not progress the Preliminary Design Documentation to Detailed Design and must not submit the associated Detailed Design Documentation until this Hold Point is released.

Table PC-EDM1 7-1 Preliminary Design Documentation Hold Point

Hold Point	Preliminary Design Documentation
Item held	Progressing to Detailed Design Documentation development
Submission details	Demonstrate the Preliminary Design achieves the specified operational outcome and key project technical requirements

7.4 Detailed Design

- a) The Contractor must ensure that the Detailed Design Documentation is sufficiently detailed to demonstrate that the design will meet all the Contract Documents requirements.
- b) The Contractor must submit the Detailed Design Documentation to the Principal in accordance with Table PC-EDM1 7-2 which will constitute a **Hold Point**. The Contractor must not progress the Detailed Design Documentation to Final Design and must not submit the associated Final Design Documentation until this Hold Point is released.

Table PC-EDM1 7-2 Detailed Design Documentation Hold Point

Hold Point	Detailed Design Documentation
Item held	Progressing to Final Design Documentation development
Submission details	Demonstrate the design will meet all the project requirements

7.5 Final Design

7.5.1 General

- a) The Contractor must ensure that the Final Design Documentation is sufficiently detailed to enable construction to take place without further explanation or clarification.
- b) For the purpose of Final Design, all Design Departures must be approved in accordance with sections 6.1b) and 8.
- c) The Contractor may resubmit any Final Design Documentation in which case the requirements of this section 7.5 will reapply.
- d) The Contractor must provide to the Principal copies of the Design Documentation prior to construction commencing on that element of work, in accordance with the IFC Design Documentation submission requirements as set out in section 7.7 and in accordance with the Construction Documentation submission requirements as set out in PC-CN3 "Construction Management".
- e) The Contractor must submit the Final Design Documentation, excluding Final Design Documentation associated with traffic control and traffic signals, to the Principal in accordance with Table PC-EDM1 7-3 which will constitute a **Hold Point**. The Contractor must not progress the Final Design Documentation to Issued for Acceptance and must not submit the associated Issued for Acceptance Design Documentation until this Hold Point is released.

Table PC-EDM1 7-3 Final Design Documentation Hold Points

Hold Point	Final Design Documentation
Item held	Progressing to Issued for Acceptance Design Documentation development
Submission details	Demonstrate the design will meet all project requirements

7.5.2 Final Design Documentation - Traffic control and traffic signal Design Documentation

- a) This section 7.5.2 only applies where the Final Design Documentation incorporates traffic control and traffic signals Design Documentation.
- b) In accordance with RD-LM-D1 “Traffic Control Device Design”, the Contractor must provide the applicable traffic control drawings and traffic impact statement in accordance with the IFC Design Documentation submission requirements, as set out in section 7.7 and in accordance with the Construction Documentation submission requirements, as set out in PC-CN3 “Construction Management”.
- c) The Contractor must submit the Final Design Documentation associated with traffic control and traffic signals to the Principal in accordance with Table PC-EDM1 7-4 which will constitute a **Hold Point**. The Contractor must not progress the Final Design Documentation associated with traffic control and traffic signals to Issued for Acceptance and must not submit the associated Issued for Acceptance Design Documentation until this Hold Point is released.

Table PC-EDM1 7-4 Traffic control - Final Design Documentation Hold Points

Hold Point	Traffic control - Final Design Documentation
Item held	Progressing to IFA Design Documentation for traffic control drawing development
Submission details	Traffic control drawings and traffic impact statement

7.5.3 Traffic signals

- a) Approval requirements for the modification, installation or removal of traffic signals are provided in RD-LM-D1 “Traffic Control Device Design”.
- b) Following acceptance of the final traffic control and traffic signal design documents the Contractor must request for the creation of traffic signal “personalities”.
- c) Traffic signal programming of traffic signal “personalities” is undertaken by the Department’s Traffic Management Centre.
- d) The Department’s Network Management Services requires 8 weeks to complete the traffic signal personalities.

7.6 Issued for Acceptance

- a) The Contractor must submit the Issued for Acceptance Design Documentation to the Principal in accordance with Table PC-EDM1 7-5 which will constitute a **Hold Point**. The Contractor must not submit the Issued for Construction Design Documentation associated with relevant Issued for Acceptance Design Documentation until this Hold Point is released.
- b) The Contractor must provide to the Principal copies of the Design Documentation prior to construction commencing on that element of work, in accordance with the IFC Design Documentation submission requirements, as set out in section 7.7 and in accordance with the Construction Documentation submission requirements, as set out in PC-CN3 “Construction Management”.
- c) At the Issued for Acceptance design stage, the Principal may:
 - i) accept the Issued for Acceptance Design Documentation and permit the Contractor to issue the Issued for Construction Design Documentation and the associated Construction Documentation, as set out in PC-CN3 “Construction Management”:
 - A. subject to inclusion of acceptance information on the Design Documentation; and
 - B. conditional to the implementation of changes noted within the Hold Point release; or
 - ii) reject the Issued for Acceptance Design Documentation and provide details on why the Issued for Acceptance Design Documentation has not been accepted.

- d) In the event the Issued for Acceptance Design Documentation is rejected by the Principal in accordance with section 7.6c)ii), the Contractor must revise, modify or amend the relevant Design Documentation and re-submit a revised Issued for Acceptance Design Documentation submission in accordance with this section 7.6.
- e) Construction of Works and Applicable Temporary Works prior to the Principal accepting the Issued for Acceptance Design Documentation and submission of the Construction Documentation in accordance with PC-CN3 "Construction Management" will be deemed a Non-Conformance and subject to the processes as detailed in PC-QA1 "Quality Management Requirements" or PC-QA2 "Quality Management Requirements for Major Projects" (as applicable).
- f) Following release of the Issued for Acceptance Hold Point (in accordance with section 7.6a)), the Contractor must update the drawings and issue the Issued for Construction Design Documentation in accordance with section 7.7.

Table PC-EDM1 7-5 Issued for Acceptance Design Documentation Hold Points

Hold Point	Issued for Acceptance Design Documentation
Item held	Issuing of the IFC Design Documentation and commencement of construction
Submission details	Final Design Documentation, and the design certifications (in accordance with section 10) and the Independent Design Certificates.

7.7 Issued for Construction

Following release of the Issued for Acceptance Hold Point in accordance with section 7.6a), the Contractor must update the Design Documentation from the Issued for Acceptance submission to identify the Design Documentation as Issued for Construction Design Documentation, revision 0, and submitted for information to the Principal, Independent Design Certifier (where relevant) and the Construction Verifier (where relevant).

7.8 Changes to IFC Design Documentation

7.8.1 Classification of change

- a) The Designer must assess the nature of any proposed change to IFC Design Documentation to determine if the potential change is:
 - i) a major change (e.g. change in the design intent, performance, or functionality); or
 - ii) a minor change (e.g. update to correct an error or omission in the documentation).
- b) The Designer's assessment of the nature of change will constitute a **Witness Point**.
- c) The Contractor must not proceed with the proposed change to the IFC Design Documentation until the Contractor has proceeded past the Witness Point in accordance with section 7.8.1b).
- d) Where the Principal or Independent Design Certifier (where relevant) does not agree the change is minor in nature the proposed change will be deemed a major change.

7.8.2 Minor changes

Where the proposed change to IFC Design Documentation is determined to be a minor change in accordance with section 7.8.1, the Contractor must submit a revision to the IFC Design Documentation (including certificates) for information to the Principal, Independent Design Certifier (where relevant) and Construction Verifier (where relevant).

7.8.3 Major changes

- a) Major changes to IFC Design Documentation (as determined in accordance with section 7.8.1), must be managed through a design change process in accordance with the Design Management Plan and as a minimum, the Contractor must:

- i) undertake all design assessment, analysis, and integration to ensure the revised design complies with the Contract Documents;
 - ii) complete a Designer's verification on the change in accordance with section 8.1, including updated certificates; and
 - iii) where the relevant element of the IFC Design Documentation was subject to Independent Design Certification, the Independent Design Certifier must review and assess the change and update the Independent Design Certificate in accordance with PC-EDM3 "Independent Design Certification".
- b) The Contractor must submit (including being subject to the associated Hold Points and Witness Points) any proposed major changes to the IFC Design Documentation at the:
- i) Issued for Acceptance stage, as set out in section 7.6; and
 - ii) Issued for Construction stage, as set out in section 7.7.

7.9 Comment resolution escalation process

- a) Where the Contractor, Principal or Independent Design Certifier disagrees with a matter raised or a response to matter (as applicable) in relation to a Design Package, they may escalate any matter that has not been able to be resolved by issuing a notice to the other parties (including the Principal, Contractor and Independent Design Certifier).
- b) The notice issued in accordance with section 7.9a) must at a minimum include the following:
 - i) the associated Design Package reference;
 - ii) details that have not been able to be resolved;
 - iii) description of the actions taken to resolve the matter; and
 - iv) details of the current position of the party issuing the notice.
- c) Following receipt of the initial notification issued in accordance with section 7.9a) for a matter of disagreement all affected parties must use reasonable endeavours to resolve the disagreement.
- d) Where a disagreement is not resolved in accordance with section 7.9c) within 10 Business Days of a notification issued under section 7.9a), either party that is part of the disagreement may refer the matter for determination by the Engineering Authority.
- e) The Engineering Authority must make a determination as to the matter and notify the Principal and Contractor of its determination and reasons, in which case, the parties must comply with that determination, subject to any other dispute obligations in the Contract Documents.

8 Design verification and certification

8.1 Designer's verification

- a) The Designer must undertake review and verification of its own design at each design stage and in accordance with the Designers quality assurance procedures and the Design Management Plan.
- b) The Designer's verification must include an inter-disciplinary review of the design to ensure integration between Design Packages.

8.2 Contractor's review

The Contractor must undertake a review of the design to consider constructability and integration of the design with construction staging and any Temporary Works at each design stage.

8.3 Independent Design Certifier

- a) Where specified in the Contract Documents the design must be reviewed by an Independent Design Certifier to check the design for compliance with the Contract Documents.
- b) The Independent Design Certification must be undertaken in accordance with PC-EDM3 "Independent Design Certification".

8.4 Principal's review

- a) The Principal may review the design to check the design for compliance with the Contract Documents.
- b) The Contractor must provide Design Documentation for review by the Independent Design Certifier and provide the following to the Principal prior to the Principal undertaking its review:
 - i) the Independent Design Certifier's response; and
 - ii) the Contractor's initial response to the Independent Design Certifier (and wherever possible, resolve the comments).

8.5 Third Party Asset owners

Where the design includes any new, modification or change to a Third Party Asset (e.g. Council asset or Utility Service Authority asset) the Principal will arrange the Design Documentation to be reviewed by the Third Party Asset owner as part of the relevant Design Documentation submission to the Principal to confirm compliance with the Third Party Asset owner's requirements.

9 Design Departures

9.1 Notification

- a) If the Contractor identifies a Design Departure (or possible Design Departure), the Contractor must notify the Principal and the Independent Design Certifier (where relevant) as soon as reasonably practicable after becoming aware of the Design Departure.
- b) The Contractor must:
 - i) identify all Design Departures within the relevant Preliminary Design Documentation submission; and
 - ii) either:
 - A. obtain the acceptance of the Principal to each Design Departure prior to the relevant Final Design Documentation submission in accordance with this section 9; or
 - B. notify the Principal and Independent Design Certifier (where relevant) that it intends to rectify the relevant Design Departure.
- c) If, at any time, the Independent Design Certifier (IDC) believes there is or may be a Design Departure, the IDC must give notice to the Contractor and the Principal of that Design Departure (or possible Design Departure) including providing a description and the reasons.
- d) If, at any time, the Principal believes there is (or may be) a Design Departure, the Principal may give notice to the Contractor and the Independent Design Certifier of the Design Departure.
- e) If the Principal or Independent Design Certifier (where relevant) notifies the Contractor that it requires additional information in relation to the Design Departure, the Contractor must submit it within 5 Business Days.

9.2 Acceptance of Design Departures

- a) Following review of the Design Departure application and any additional information requested, the Principal will notify the Contractor following that it:
 - i) accepts the Design Departure,
 - ii) accepts the Design Departure subject to any conditions specified by the Principal; or
 - iii) does not accept the Design Departure.
- b) The Contractor must submit a request to the Principal for acceptance of a Design Departure and submit a copy to the Independent Design Certifier (where relevant), which will constitute a **Hold Point, (Design Departure)**.
- c) A Design Departure accepted by the Principal (following release of the Hold Point in accordance with section 9.2b) will be deemed to be an Accepted Design Departure, provided that the Contractor complies with any conditions specified by the Principal.
- d) Except to the extent that the Design Departure has an impact that was not identified by the Contractor in the Design Departure application, a Design Departure accepted by the Principal (following release of the Hold Point in accordance with section 9.2b)) will be deemed to be an Accepted Design Departure, provided that the Contractor complies with any conditions specified by the Principal.
- e) Any conditions specified by the Principal must be closed or satisfied as a condition precedent to Handover and Completion.
- f) If the Principal does not accept the Design Departure application the Contractor must update the Design Documentation to remove the Design Departure in accordance with the Contract Documents.
- g) All Design Departures must be recorded in a register, which as a minimum must include the following:
 - i) details of each Design Departure;
 - ii) details of any conditions imposed by the Principal;
 - iii) reference to the Design Package and Non-Conformance (if applicable); and
 - iv) details of the status of the Design Departure.

10 Design certificates

- a) The Contractor must ensure that certificates to confirm the Design Documentation complies with the Contract Documents are prepared and submitted to the Principal which:
 - i) certify that the Design Documentation complies with the requirements of the Contract Documents;
 - ii) are included within the Issued for Acceptance Design Documentation submission;
 - iii) are signed by authorised representatives of the constructor and the Designer; and
 - iv) are in accordance with the form included in Appendix 1: Designer's - Certificate of .
- b) Unless agreed otherwise in writing with the Principal, design certificates must not be qualified in any way which would lessen the effect of the certificate.

11 Construction of the Works

- a) The Contractor must not commence construction of individual elements of the Works prior to the Principal releasing the relevant Issued for Acceptance Design Documentation Hold Point on Design Package(s) (as detailed within the accepted work breakdown structure of section 5.4).

- b) Where the requirements of section 11a) are not met the individual elements of the Works will be deemed as a Non-Conformance in accordance with PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable).
- c) Following submission of IFC Design Documentation, a Design Departure identified as part of a construction Non-Conformance must be managed in accordance with PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable), including the requirements for Design Departures in this Master Specification Part.
- d) The Contractor must not proceed or continue with any Works or Applicable Temporary Works associated with an identified Design Departure after the submission of the relevant IFC Design Documentation until either:
 - i) the Contractor notifies the Principal and Independent Design Certifier (where relevant) that it intends to rectify the relevant Design Departure; or
 - ii) the Design Departure is considered an Accepted Design Departure in accordance with section 9.2.
- e) If the Contractor elects to rectify the Design Departure in accordance with section 11d)i), the Contractor must promptly rectify the Design Departure in accordance with the Contract Documents.

12 Construction phase services

12.1 General

- a) During the construction phase, representatives of the Designer’s organisation must be available to support the construction team and Construction Verifier (where relevant) in the following areas:
 - i) requests for information - provision of responses to requests for information to address design errors, clarify ambiguities, and deal with Site-based challenges during the construction of the IFC Design Documentation;
 - ii) where the Observational Method has been adopted in any part of the design, and subject to the agreed roles and responsibilities documented in the Design Management Plan, the Designer must certify and provide a copy of the certification to the Principal that the appropriate design solution is selected based on actual Site conditions observed during construction;
 - iii) design validation - inspecting all or parts of the Works and Applicable Temporary Works on Site to ensure that it aligns with the IFC Design Documentation intent where required under the Contract Documents or requested for other purposes;
 - iv) Shop Drawings and vendor documents - reviewing and approving Shop Drawings and vendor data to ensure that it aligns with the intent of the IFC Design Documentation including in accordance with ST-SS-S1 “Fabrication of Structural Steelwork” (as applicable); and
 - v) Non-Conformances - review the impact on the design of any Non-Conformances as a part of the construction process.
- b) Records of all construction phase services provided must be provided to the Principal at Handover and Completion.

12.2 Completion Design Documentation

- a) The Contractor must submit completion design documents (As-built) in accordance with PC-CN2 “Asset Handover”.

- b) Where digital engineering requirements in accordance with PC-EDM5 “Digital Engineering” are not required as part of the Contract Documents, the Contractor must prior to submission of the finalised Design Documentation in accordance with section 12.2c):
- i) update the Design Drawings forming part of the Issued for Construction Design Documentation with red line mark-ups to capture “as-constructed” changes for review by the Principal, Construction Verifier (where relevant) and the Independent Design Certifier (where relevant); and
 - ii) back-draft any reasonable comments provided by the Principal, Construction Verifier and Independent Design Certifier (where relevant), to produce the finalised Design Drawings.
- c) The Contractor must submit to the Principal finalised Design Documentation that represent the as-built Works in accordance with Table PC-EDM1 12-1, which will constitute a **Hold Point**. The release of this Hold Point is a condition precedent to Handover and Completion.
- d) The Contractor must update the finalised Design Documentation with any reasonable comments provided by the Principal.

Table PC-EDM1 12-1 Completion Design Documentation Hold Points

Hold Point	As-Built Records
Item held	Completion
Submission details	Completion Design Documentation (As-Built Records)

13 Hold Points and Witness Points

- a) Table PC-EDM1 13-1 details the review period or notification period, and nominated review parties for each Hold Point referred to in this Master Specification Part.
- b) Table PC-EDM1 13-2 details the review period or notification period, and nominated review parties for each Witness Point referred to in this Master Specification Part.
- c) For the purposes of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) all Hold Points and Witness Points detailed in Table PC-EDM1 13-1 and Table PC-EDM1 13-2 must be treated as a documentation type.
- d) For the purposes of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) all the Hold Points and Witness Points detailed in Table PC-EDM1 13-1 and Table PC-EDM1 13-2, except for those related to the Design Basis, Design Departure applications and work breakdown structures, do not require submission to the Independent Design Certifier.

Table PC-EDM1 13-1 Hold Points

Section reference	Hold Point	Review period or notification period
6.2b)	Design Basis	5 Business Days review for the Principal
7.3e)	Preliminary Design Documentation	7 Business Days review for the Principal
7.4b)	Detailed Design Documentation	7 Business Days review for the Principal
7.5.1e)	Final Design Documentation	7 Business Days review for the Principal
7.5.2c)	Final Design Documentation (traffic control and traffic signals)	15 Business Days review for the Principal
7.6a)	Issued for Acceptance Design Documentation	5 Business Days review for the Principal
		a) As required for the Principal
		b) As detailed in PC-EDM3
9.2b)	Design Departure application	“Independent Design Certification” for review by the Independent Design Certifier (where relevant)

Section reference	Hold Point	Review period or notification period
12.2c)	Finalised Design Documentation	10 Business Days review for the Principal

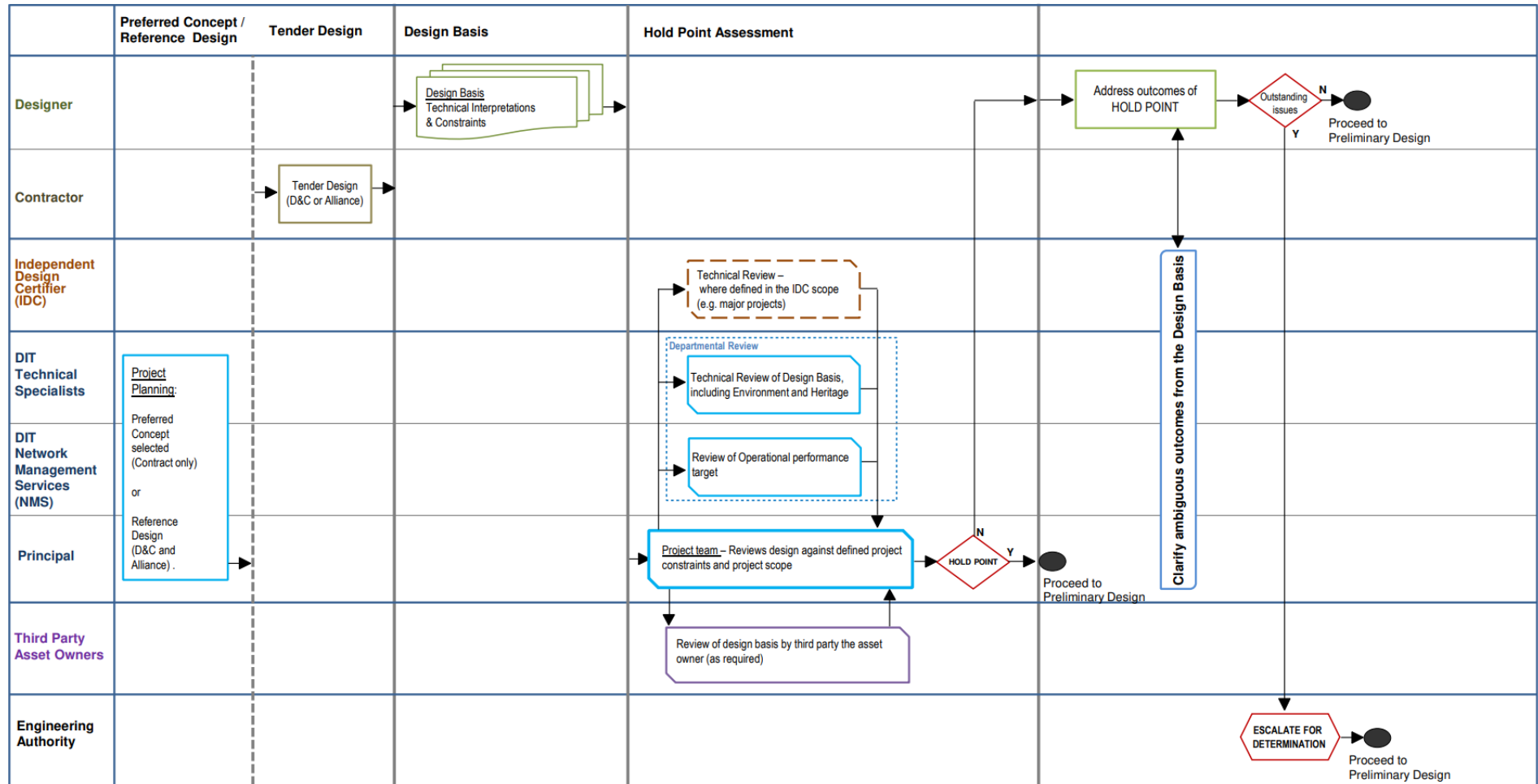
Table PC-EDM1 13-2 Witness Points

Section reference	Witness Point	Review period or notification period
5.4c)	Work breakdown structure	10 Business Days review for the Principal
7.8.1b)	Proposed change to IFC Design Documentation	5 Business Days for the Principal

15 Appendix 2: Design process flow charts

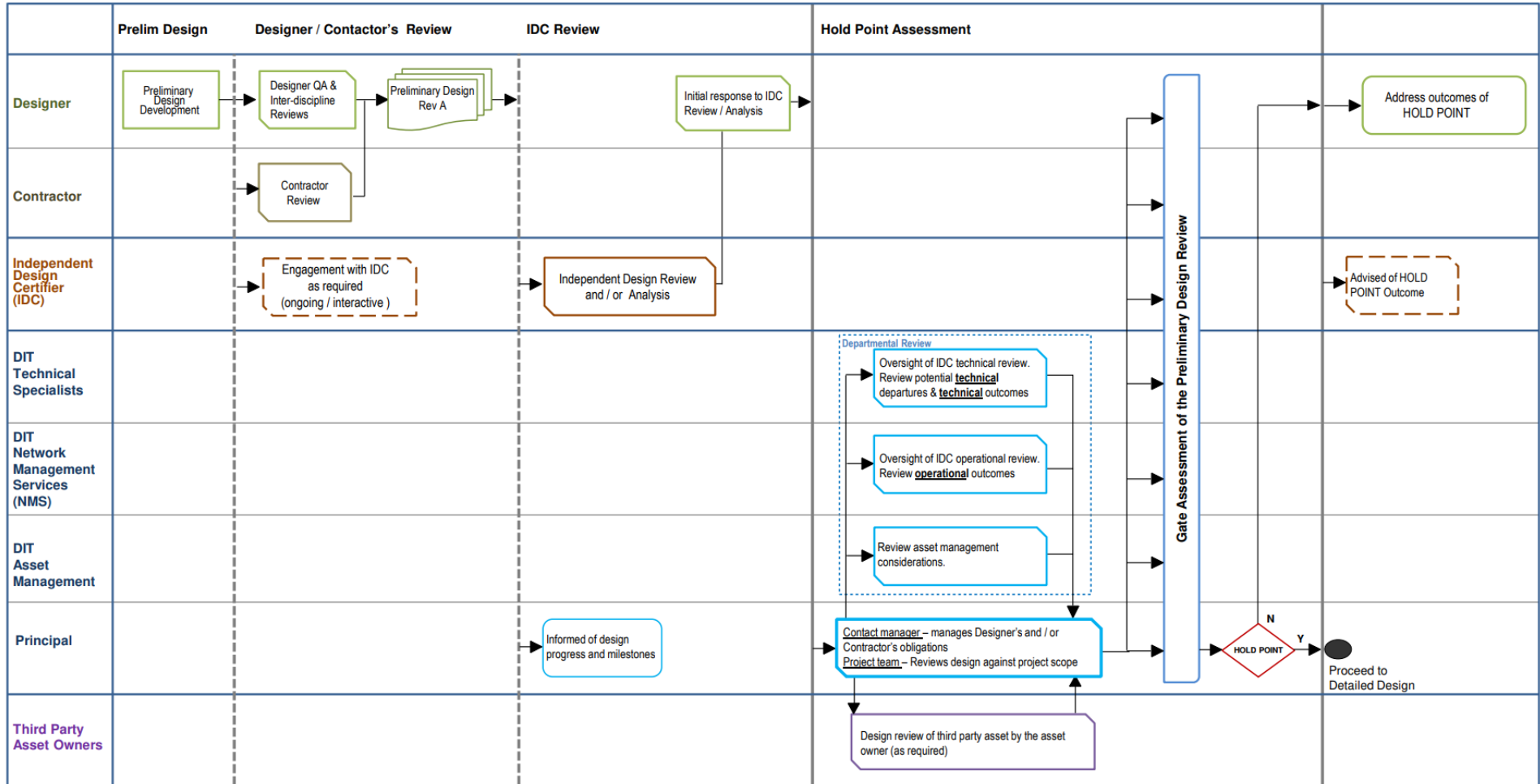


Design Basis - Flow Chart.



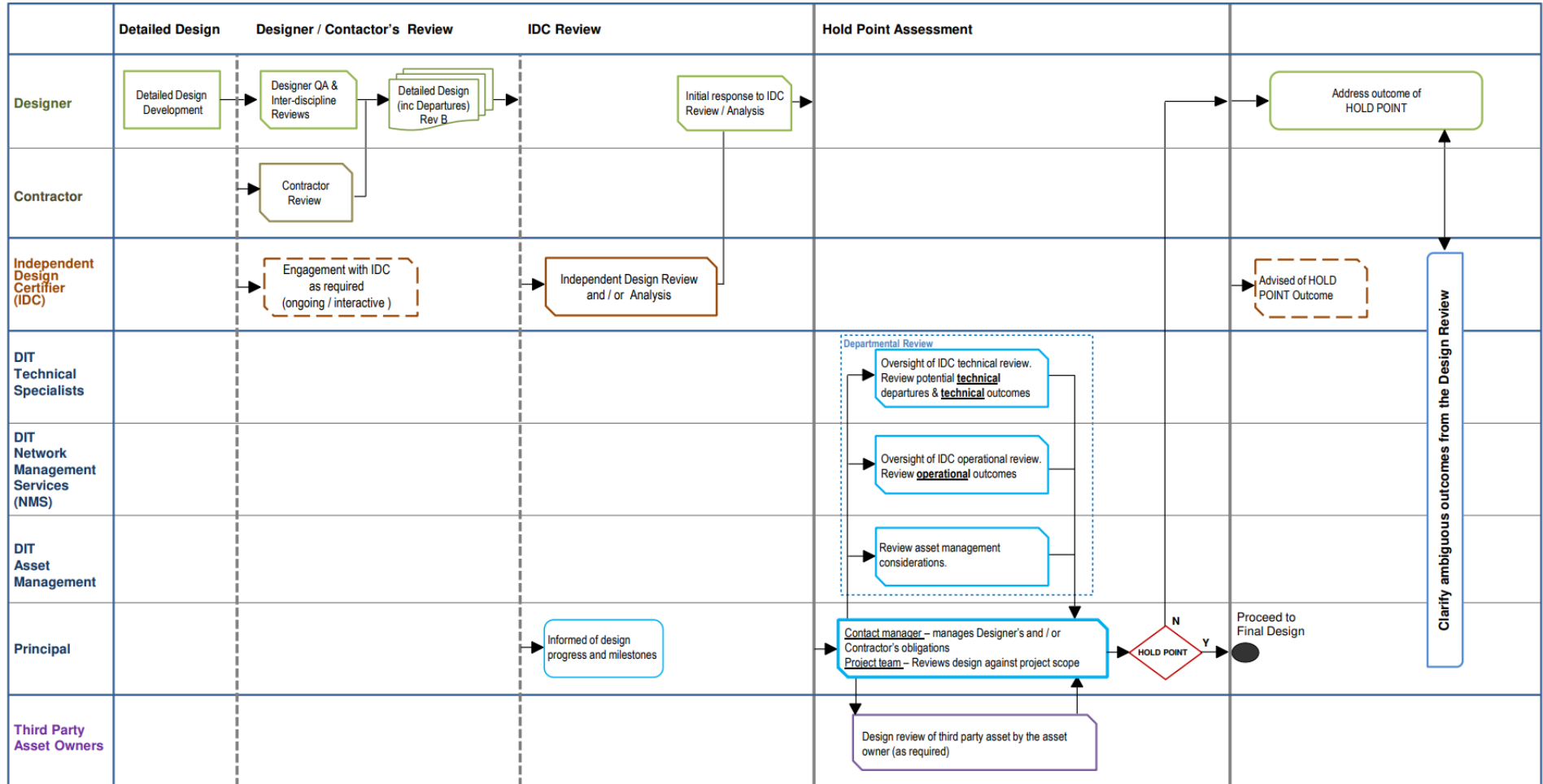


Preliminary Design Review - Flow Chart.



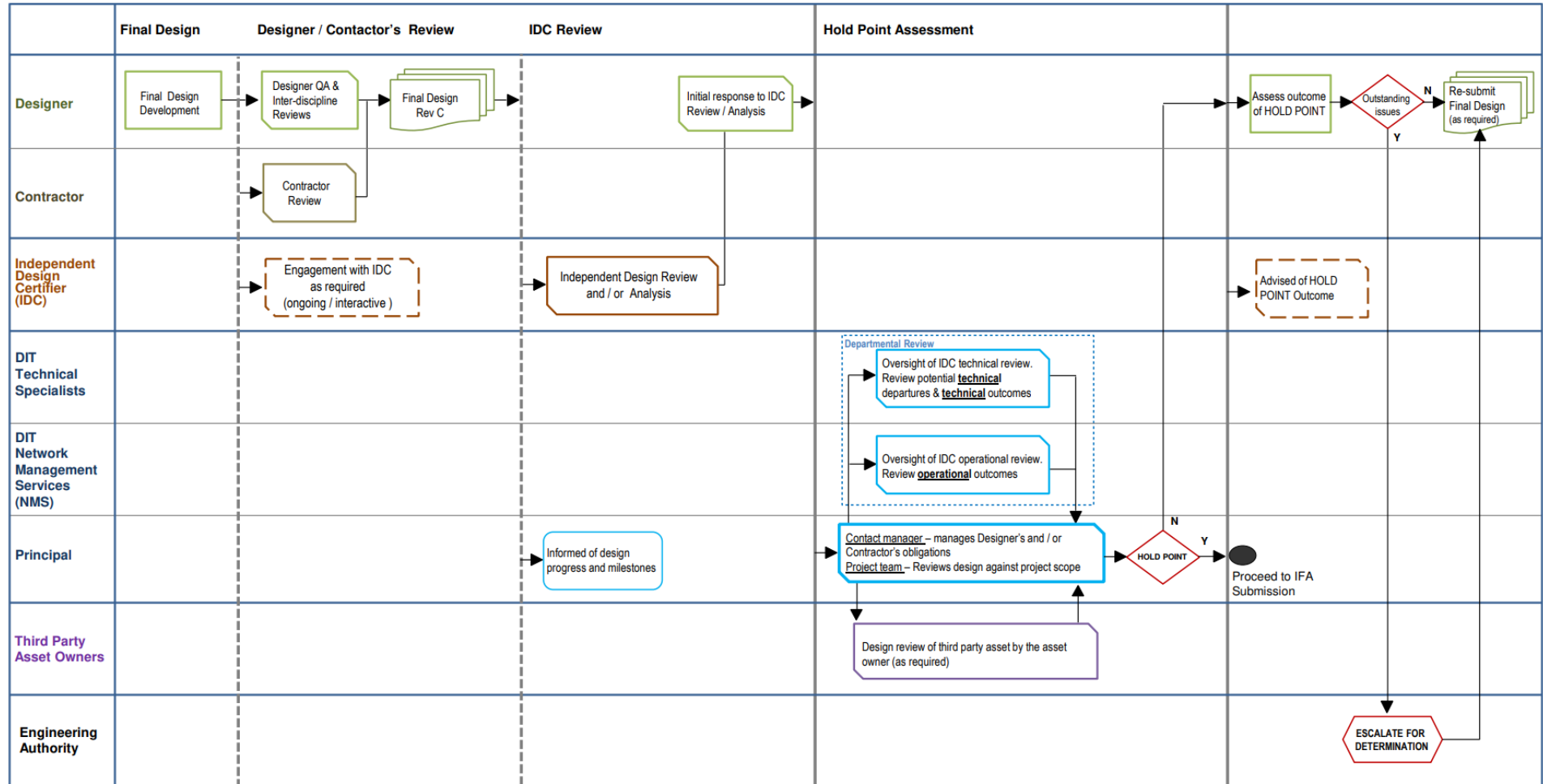


Detailed Design Review - Flow Chart.





Final Design Review - Flow Chart.





Issued for Acceptance - Flow Chart.

