SPI PowerNet Pty Ltd

Electricity Transmission Revenue Proposal 2014/15 – 2016/17

Appendix 4C:
SP AusNet's Project Cost Estimating Methodology

Submitted: 28 February 2013

SP AusNet
A member of Singapore Power Group

PROJECT ENGINEERING

PROJECT COST ESTIMATING METHODOLOGY

TRR 2014/15 – 2016/17

REVISION HISTORY

Revision	Date	Reason for Change	Issued by	Approved by
0	19 Dec 2012	Original Issue	S Liyanage	R Hughan
1	07 Feb 2013	Minor Updates	S Liyanage	R Hughan

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1 BACKGROUND

The Project Engineering Group within Networks Strategy and Development Division (NSD) is responsible for providing:

a. Project cost estimates for the *Initiation Phase* of projects, used for initial cost/benefit analysis, optimisation and prioritisation;

b. Project cost estimates for the *Planning Phase* of projects, used for development and approval of a *Business Case*;

c. Project cost estimates called '*Control Estimates*' for the *Implementation/delivery Phase* of projects, used along with design release for validation of a *Business Case* and cost control purposes;

d. Project cost analysis for the *Finalisation Phase* of projects to compare the cost estimate with the actual cost for continual development and maintenance of the estimation database; and

e. Regular reviews of estimation systems and estimation database in order to facilitate continuous improvement.

Appendix – A: Program / Project Lifecycle Process Map Framework Overlay shows the detail of different phases of a project in it lifecycle.

1.1 PURPOSE AND APPLICATION

The purpose of this document is to provide information to the Australian Energy Regulator (AER) on the estimating outcomes, principles, methodologies and procedures used for the preparation of cost estimates for all major capital projects developed by SP AusNet for the Transmission Revenue Reset (TRR) submission for the regulatory period 2014/15 – 2016/17.

1.2 SCOPE

The scope of this document mainly covers the preparation of project estimates during the *Initiation / planning phases* of projects.

The scope of this document excludes discussion on other tools currently used to support the project creation, development, execution, monitoring and reporting such as, CAP[1] , PET[2], NPV[3] Model, Business Case Documentation/Templates, Finance, Oracle, Corporate Risk Framework, EPM[4], PFT[5], and the Project Operation Manual.

[1] Capital Project Evaluation Database

[2] Project Execution and Tracking

[3] Net Present Value

[4] Enterprise Project Management

[5] Project Forecasting Tool

2 ESTIMATING OUTCOME

SP AusNet's estimating process is focused on preparation of a *P(90) estimate* which is 'unlikely to be exceeded but not excessively conservative'. The *P(90)* estimate is used internally for B*usiness Case* approval. The process of generating a *P(90*) estimate also generates a *P(50)* estimate.

2.1 TRR ESTIMATES

The project cost estimates used to develop the TRR CAPEX forecast are on the basis of *P(50) estimate* outcomes. A *P(50) estimate* outcome does not include the *Management Reserve* derived for a project.

A project's *Management Reserve* allowance is used internally to cover unforeseen items and is released to the project manager through a controlled project delivery process.

2.2 ESTIMATING PRINCIPLES

SP AusNet's estimates are founded on five key principles.

1. All projects are to be project managed in accordance with the SP AusNet project execution procedures & practices.
2. For *Business Case* (financial) approval and implementation, *P(90) estimates*, provide confidence in the processes of project priority, affordability and strategic fit.
3. Estimates are subject to reviews and a sign-off process based on consistent clear lines of responsibility and accountability that will ensure costing standards and controls are applied to any budget information that is to be released.
4. Regular system reviews are conducted to encourage and facilitate continuous improvements.
5. Project learnings will be shared to increase corporate knowledge.

2.3 ESTIMATING RATIONALE

SP AusNet recognises that cost management, including cost estimating, must be exercised in the broader context of project management. Estimating is an integral part of a system of interdependent core inputs of scope, time, cost and quality. The project budget results from approval of the business case equivalent estimate at the conclusion of the *Initiation Phase*. This P*roject Estimate* (*Planning Estimate*), which is based on a sound definition of the scope of the preferred option from the options analysis, is of critical importance in the economic justification (cost/benefit) of the project.

The projects developed by SP AusNet and information provided in the TRR submission are based on needs in order to address asset condition, safety, and regulatory obligations in its transmission network. Identifying and funding the highest priority works to meet these needs, and delivering them through an efficient program, is underpinned by sound project cost estimation.

Estimating in the current market environment requires a conservative but realistic view of the project scope together with the associated *Project Components* and *Project Specific External Uncertainties*, particularly in the early project stages where less detailed project information is available. Estimators must make provision for items that are considered likely to be required,

having regard to such inputs as environmental determinants and community input on the final project scope. Such items are included as *Provisional Items* and not through an increase in *Management Reserve*.

The challenge for the estimator is to arrive at a realistic (that is, not overly conservative) view of the project scope and associated *Project Uncertainties*, and assign appropriate quantities for *Project Uncertainties* and *Management Reserve* in order to produce a meaningful estimate within the *P(90)*. All estimates must include a detailed consideration of SP AusNet's project costs, including project preparation, engineering and management. These costs may be estimated using typical values or estimated on a first principles basis, taking into account the expected SP AusNet personnel required for the project and their costs. Estimates are applicable only to a particular project scope, or range of scopes or program of works, which must be clearly defined as part of the estimate.

Each estimate shall be presented using a standard *Business Case* format, and incorporate a report that defines the scope and assumptions on which the estimate has been based.

3 ESTIMATING PROCESSES

Documented estimating processes exist to provide costing for various stages of a project as detailed in the Program / Project Lifecycle Process Diagram.

For details please refer to Appendix – B: SOP 17-16 Methodology Overlay – Program / Project Lifecycle Process Diagram.

3.1 ESTIMATE TYPES

To assist with the *Initiation Phase* of projects, Project Engineering develops *Indicative* and / or *Planning Estimates*. Project Engineering, in collaboration with other key stakeholders in the business, develops suitable scopes of work to enable top down estimation of projects for option selection, regulatory submission and *Business Case* (financial) approval.

A *Control Estimate* is developed after the completion of detailed design for project implementation based on the detailed scope of work, detailed design and detailed project documents.

These types of estimate are further detailed below.

3.1.1 Indicative Estimate

An *Indicative Estimate* is used to develop a project from initial concepts. Often the information is preliminary and high level in nature with broad functional requirements. The indicative estimation process provides approximate costs for determination of project feasibility, options analysis and selection.

The estimating process requires consultation and facilitation of various stakeholders to determine the best approach to achieving the functional requirements in the most effective manner.

This process is outlined in the NSD Business Process Model in Appendix – C: F2.1 Develop High Level Project Scope.

An *Indicative Estimate* is often undertaken as a desktop estimate with allowances allocated to loosely defined scope items and appropriate quantities of *Project Uncertainties* allocated for unknowns.

Inputs:

- Broad functional requirements (Mandatory)
- Simple single line diagram (Preferred)
- Functional scope (Desirable if available)
- Implementation methodology (Desirable if available)
- Human resources plan (Desirable if available), and
- *Project schedule* (Desirable if available)

Outputs:

- *Indicative Estimate* based on the standard MS Word template generally including multiple options with estimated (top down) costs to determine project feasibility and enable option selection, and
- Handover checklist

- Sign-off

3.1.2 Planning Estimate

A *Planning Estimate* is used to develop a project that has been initially developed as a concept but now requires further scoping and costing. Information is specific and a high level scope may have been produced by Project Engineering. The planning estimate process provides for the further development of options and utilises a top down model to develop costs for options analysis and selection.

The main difference between the *Indicative* and *Planning Estimates* is the quality of the information available, the amount of detail in the scope of work and the provision of build-up and standard pricings rather than allowances.

Once a final option has been chosen the *Planning Estimate* is adjusted with *Project Uncertainties* and the estimate used for *Business Case* (financial) approval.

The estimate process requires detailed consultation and facilitation of various stakeholders to determine the best approach to achieving the functional requirements in the most effective manner.

This process is outlined in the NSD Business Process Model in the Appendix – C: F2.1 Develop High Level Project Scope.

Inputs:

- Specific functional requirement (Mandatory)
- Simple single line diagram (Preferred)
- Functional scope (Desirable if available)
- *FEED* study or other study reports (If available)
- Documented *Project Uncertainty Register*
- Implementation methodology
- Human resources plan, and
- *Project Schedule*

Outputs:

1) Unadjusted *Planning Estimate*:
   - *Planning Estimate* based on the standard MS Word template generally including multiple options with top down costs to enable option selection, and
   - Handover checklist
2) Uncertainty-Adjusted Planning Estimate:
   - *Planning Estimate* based on the standard MS Word template for the preferred option only with project uncertainty adjusted top down costs model to provide information for financial approval of the project
   - Documented *Project Uncertainty Register*
   - Summary and *IDC* work sheets from the template
   - Handover checklist, and
   - Sign-off

3.1.3 Control Estimate

A *Control Estimate* is developed after the completion of detailed design for project implementation based on the detailed scope of work, detailed design and detailed project documents.

The scope of this document excludes the detailed discussion of the development of a *Control Estimate*. However, the process used is outlined in Appendix – D: F2.3 Develop Detailed Project Estimate**,** for information.

4 ESTIMATING METHODOLOGY

4.1 INDICATIVE / PLANNING ESTIMATES

The development of top-down estimates requires the development of a scope of work and an EXCEL Workbook template based estimate.

The scope of work is developed as an iterative process which follows the process outlined in Appendix – C: F2.1 Develop High Level Project Scope. This process is documented in NSD Business Process Model document 'F2.1 Develop Broad Scope and Estimation [PE]'.

The tool for the estimation of *Indicative and Planning estimates* is an EXCEL Workbook template developed in basic alignment with the Detailed Scope of Works template.

The EXCEL Workbook template is comprised of multiple worksheets. It allows the user to compile multiple 500/220/66kV, 220/66/22kV and 330/220/132kV worksheets without modification of formulae or columns. Additional sheets and columns can be added as required. The individual worksheets can be used as separate 'stages' within a project or completely independent 'options', chosen on the summary sheet. *Overheads* and '*Interest-During-Construction' (IDC)* are calculated automatically with the user required to provide a cash flow on the '*IDC* worksheet'.

The methodology used to produce Indicative / Planning scope of works and estimates is shown in Figure 1.

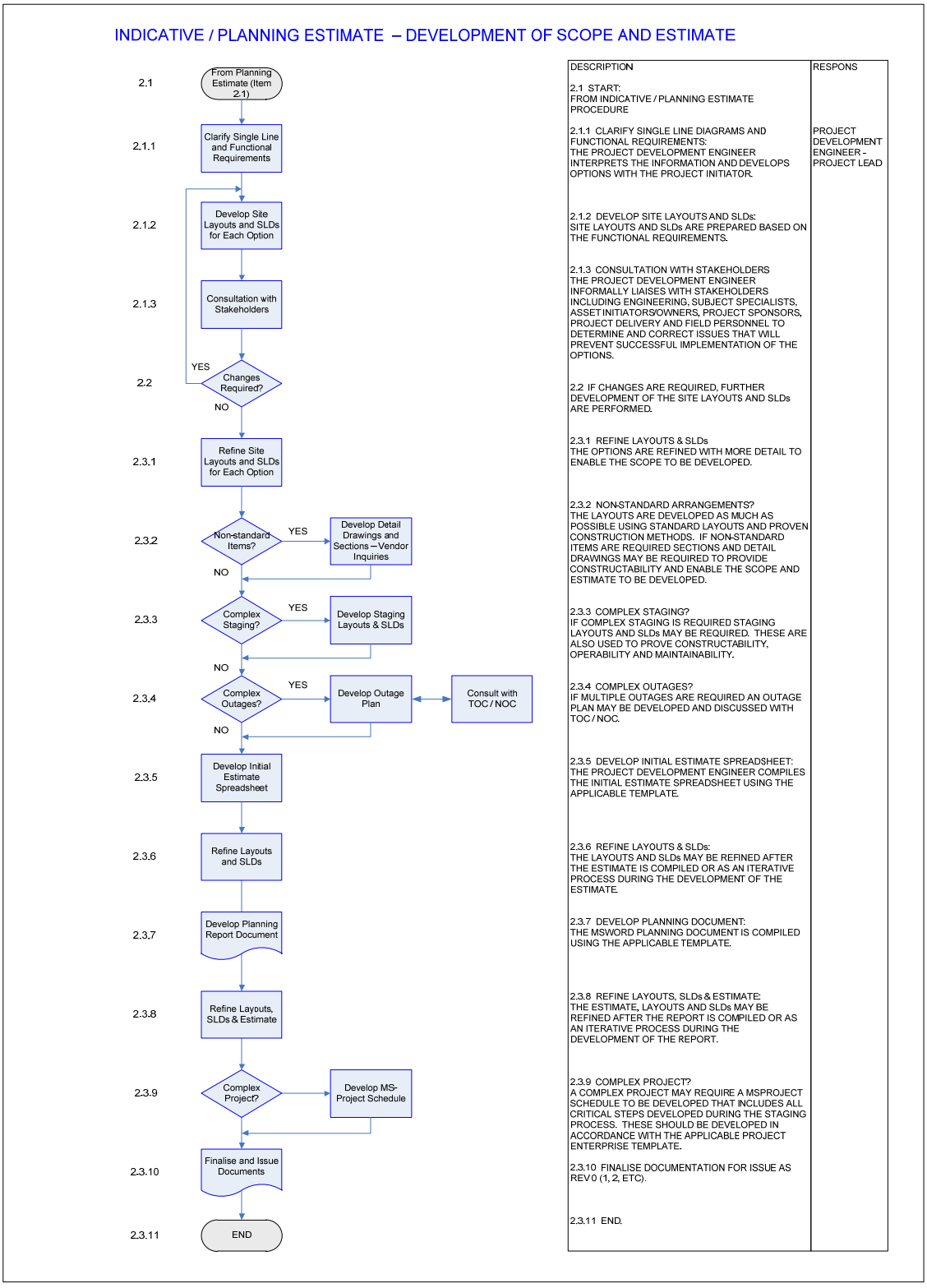


Figure 1: Indicative / Planning scope and estimate development methodology

4.1.1 Layout and Single Line Diagrams

To enable an estimate to be compiled, single line diagrams and layout sketches are developed. These enable an outline scope to be written as part of the '*Planning Estimate*' document.

4.1.2 Top-Down Transmission Estimating Template

The EXCEL Workbook template includes the provision of 'standard bays' and equipment units generally in use across the SP AusNet Transmission System. The standard bays include all typical costs associated with the installation of a bay. Alternatively the bays can be built up with the individual components using the drop down options as necessary.

The EXCEL Workbook template comprises the following worksheets.

4.1.2.1 Revision History

This worksheet contains both the review history of ongoing developments of workbook (only administered by the Estimating Team) and the review history of a specific project estimate (used by the end user).

This will allows users to:

1) Enter project number and project name
2) Keep record of dates, details of estimate revisions, and the name of estimator/s

4.1.2.2 Detailed Worksheets

The detailed worksheets are arranged in a similar manner to a detailed scope of work. The template has been structured with multiple 500/220/66kV and 220/66/22kV worksheets and one 330/220/132kV worksheet in general. Additional sheets may be added by using the Worksheet/Move/Copy command. Where extra sheets are added these are included in the summary sheet.

4.1.2.3 Summary Worksheet

This worksheet contains the summary information from the detailed worksheets and allows the user to:

1) Select the worksheets as 'Options'
2) Select 'Stages' in case of a multi-staged project
3) If used for 'Options' analysis, then select the 'Preferred Option' for calculation of *IDC* and *Overheads*
4) Enter operating expenditure and '*Written-Down-Values'*
5) The *Management Reserve*, *Overheads*, *IDC*s, etc. can be entered for each 'Stage' / 'Option'

This summary sheet is formatted in the same manner as the standard *Business Case* template.

This worksheet is used to copy and 'paste special/values' to the planning report.

The estimate summary sheet is also made available to be eventually attached to *PET* or forwarded to others for incorporation into *Business Case* documentation or other documents.

4.1.2.4 IDC Worksheet

This worksheet is used to enter the cash flow and calculates the *overheads* and finance charges based on the sum of the 'Stages' or the 'Preferred Option'. The information from the summary worksheet is automatically transferred to the *IDC* sheet when the correct option is chosen on the summary sheet, and allows the user to:

1) Select the starting year of the project
2) Distribute the cash flow over the relevant project time line. A default cash flow provides some basic information on the generation of the cash flow
3) Select the amount transferred into asset

The amount of finance charge and *overheads* is automatically transferred to the relevant location on the summary sheet.

This worksheet enables costs to be recorded generally over five years, with three years in detail and two years in summary. Additional years can be added as required.

4.1.2.5 Project Uncertainty Results Worksheet:

The outcomes from the assessment of project uncertainties provide inputs into this worksheet. This worksheet is then used to transfer the project P(50) and P(90) estimate outcomes to the summary worksheet.

4.1.2.6 Percentage Allowances

SPA Internal Labour

SP AusNet internal labour costs are determined as a percentage of the total direct costs of the project based on historical outturn costs of delivering similar projects.

These costs include:

1) Project development costs up to approval
2) Cost of project management, supervision and procurement services through the *Implementation Phase* of the project
3) Cost of internal engineering support during delivery
4) Cost of project close-out

Design

Design costs are determined as a percentage of the total direct costs of the project based on historical quotations or outturn costs of similar projects.

Contractor Indirect Costs

The *Contractor Indirect Costs* are determined as a percentage of the total direct costs of the project based on historical quotations or outturn costs of similar projects.

These costs include the non-direct labour and materials cost of the *Installation Service Provider (ISP)*:

1) Inductions

2) Site and shift allowances etc.
3) Travel time or allowances
4) Living Away from Home Costs (accommodation, meals, etc.)
5) Contractor project management and supervision costs
6) Contractor OH&S and quality control costs
7) Contractor procurement and administration costs
8) Contractor support equipment including computers, faxes, phones, refrigerators, potable water, etc. for the contractor to perform their work on site
9) Contractor vehicles (plant is allowed in item costs)
10) Contractor site establishment and maintenance costs including huts, site clean-up, etc.
11) Contractor provision of huts and amenities for SP AusNet personnel
12) Contractor overheads and off-site support costs

Project Uncertainty Allowance

A nominal value between 5 – 10% of the total direct costs including internal SPA costs, design and sub-contractor indirect is generally added at the options analysis stage of the process.

This item is refined once the *quantitative assessment of project uncertainties* is undertaken and the outcomes of *Project Uncertainty* and *Management Reserve* are derived through simulation.

4.1.3 Project Uncertainty and @Risk® Simulation

The *Quantitative Assessment of Project Uncertainty* and the *@Risk® Simulation* is also incorporated and applied in the Workbook Template. The process of *Quantitative Assessment of Project Uncertainty* is detailed in **Section 5.2** below.

4.2 CONTROL ESTIMATES

The development of the *Control Estimate* (Bottom-up Estimate) requires the development of a detailed scope of work and an *Expert Estimation®* library based estimate.

5 ASSESSMENT OF PROJECT UNCERTAINTIES

SP AusNet applies an uncertainty based approach toward estimating through the implementation of a *Qualitative and Quantitative assessment of project uncertainty* framework. The framework involves the joint collaboration of SP AusNet stakeholders to assess project uncertainties from the project *Initiation* to *Finalisation* phases. The Estimating Team facilitates the *Planning* phases of the framework and administers the *Quantitative Assessment of Project Uncertainties*.

Figure 2: Assessment of project uncertainty quick reference map through the project life cycle, shows the points during the project life cycle where project uncertainty is assessed. The uncertainty points shown in this figure are referenced in the process map shown in Appendix – E: SOP 17-16 Project Uncertainty Overlay - Program Project Lifecycles Process Map.

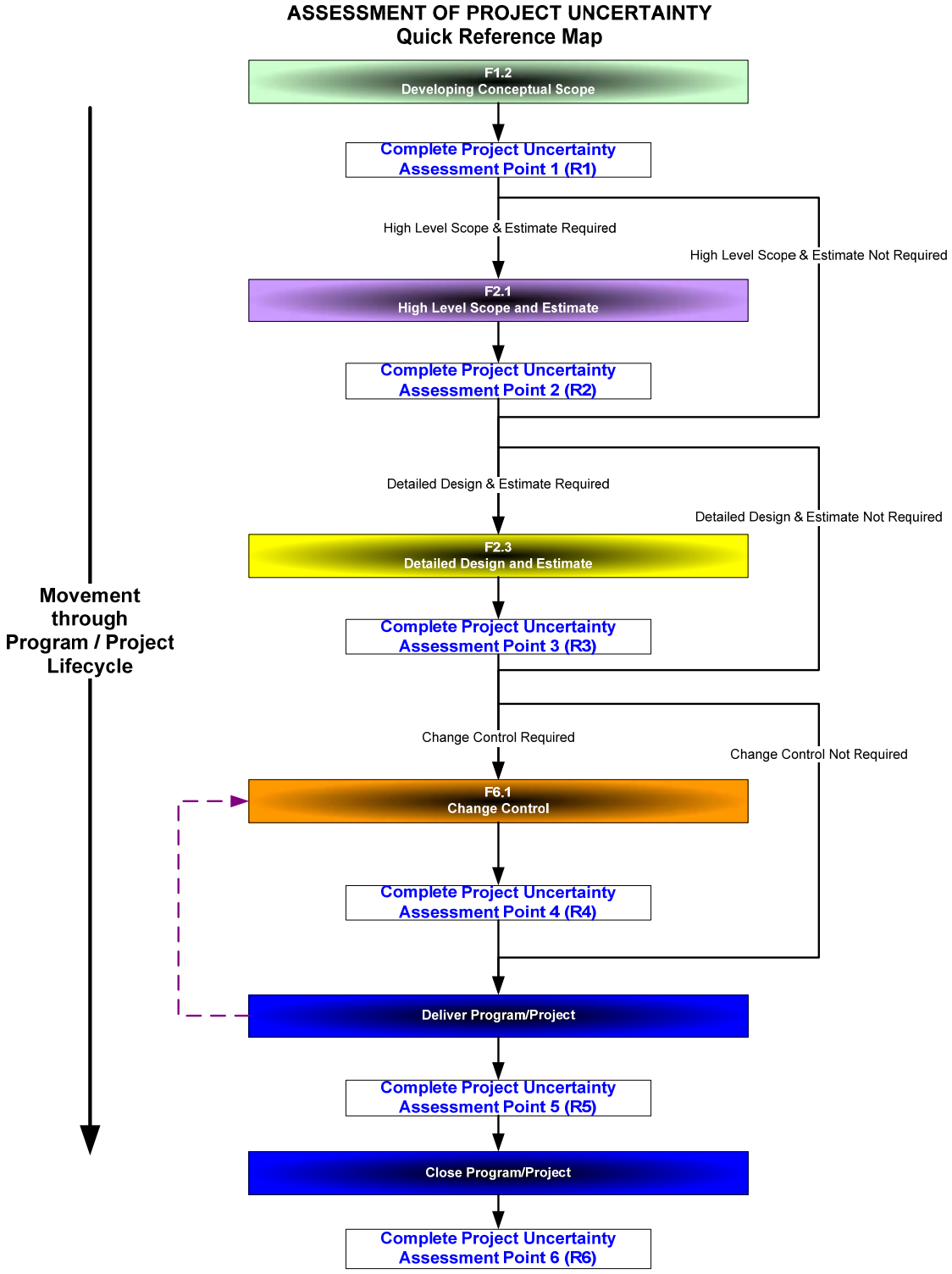


Figure 2: Assessment of project uncertainty quick reference map through the project life cycle

5.1 PROJECT CLASSIFICATION

The class of project determines the level of rigor around the scoping, estimating and the *Quantitative assessment of project uncertainties*.

For this, three classifications have been established as below;

- **Class 1 Project**: A significant project that is a complex project with high project uncertainty or cost and thus requires a higher amount of rigor and control.
- **Class 2 Project**: A relatively straightforward project with low project uncertainty for which a lesser amount of rigor and control is appropriate.
- **Class 3 Project**: A small, simple, low cost project that can progress quickly through the Initiation and Planning phases.

Project Class	Criteria Description
1	• Highest residual project uncertainty level of any identified uncertainty is I, in accordance with Corporate Project Uncertainty Management Framework • Projects exceeding *PAC*[6] authority of approval • Require planning approval • Impedes future expansion • New easement or property acquisition • Outage restrictions or outages affecting large customer numbers • Non-standard project or installation • Not done before • New contractual arrangement, non-core • High level commercial uncertainty • It is a political, emotive or highly sensitive project where performance is highly visible • Significant Health and Safety risk to SP AusNet/contractors due to deviation from standard construction practices/site specific conditions
2	• Highest residual uncertainty level of all identified uncertainties is II, in accordance with Corporate Project Uncertainty Management Framework • A project or scope of works > $500K using standard *DSP* and *ISP* • Standard “fast track” project as long as it has been done before • Project Cost < $500K which does not use standard *ISP/DSP*
3	• Highest residual uncertainty level of all identified uncertainties is III or IV, in accordance with Corporate Project Uncertainty Management Framework • A project or scope of works < $500K using standard *DSP* and *ISP* • Materials supply only based on standard specifications (if a specification must be written then it is NOT a standard material supply). • Services only < $500K, which uses either internal or external resources (e.g.: *FEED* studies surveys, geotech, concept design)

[6] Project Approval Committee

Figure 3 below diagrammatically illustrates the project classification and the level of rigor applied in the assessment of project uncertainties, depending on the project class.

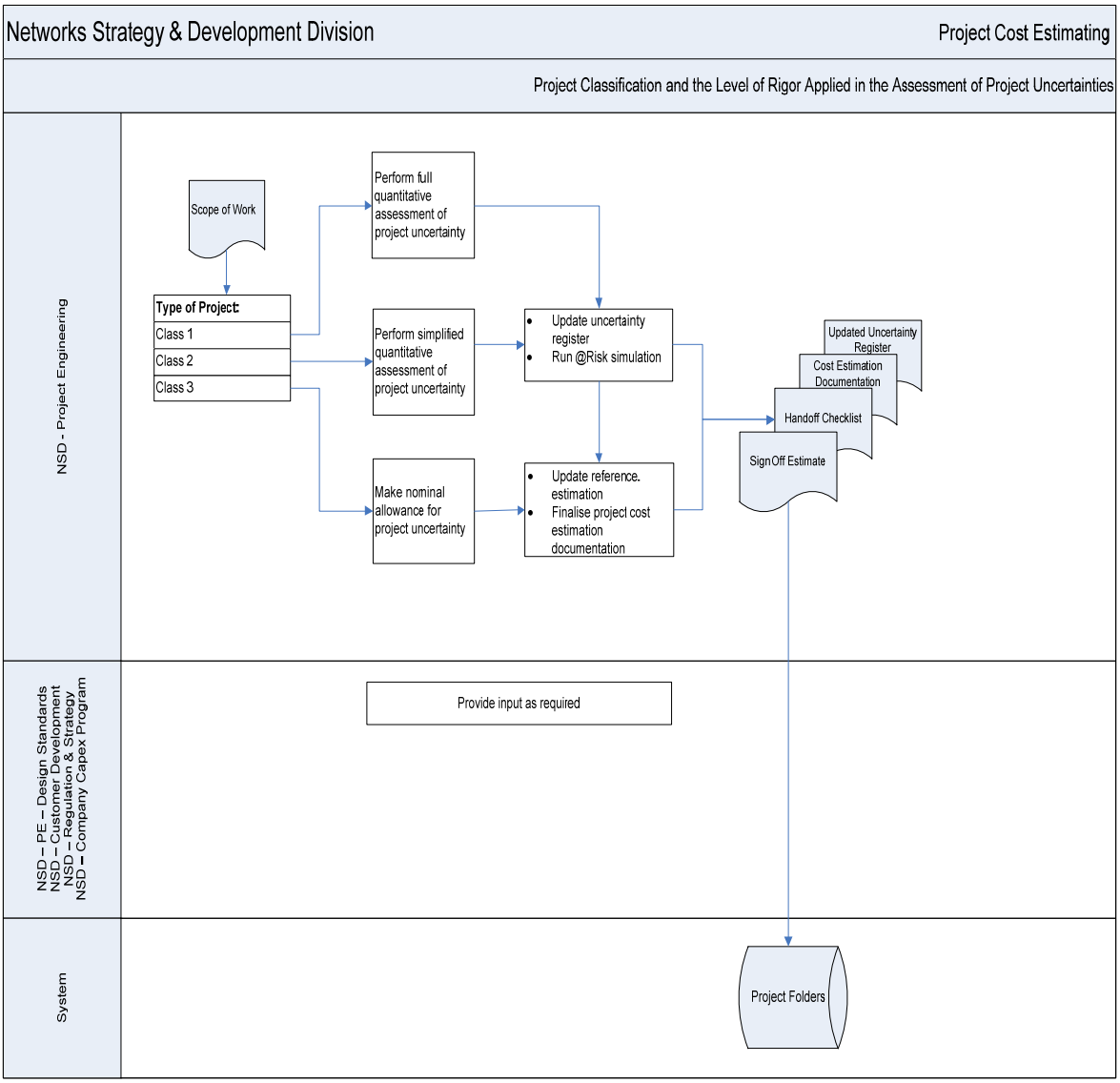


Figure 3: Project classification and the level of rigor applied in the assessment of project uncertainties

5.2 QUALITATIVE ASSESSMENT OF PROJECT UNCERTAINTIES

The first step in quantifying the cost impact is to assess the P*roject Uncertainties* and uncertainty management measures that exist on each individual project or program of work. This is called the *Qualitative assessment of project uncertainties*. This is performed by the project Initiator / Owner / Sponsor after the development of the high level functional scope is complete. The *Qualitative assessment of project uncertainties* is documented using the standard format of the *project uncertainty register* template and using the uncertainty assessment tables in the Project Uncertainty Management Framework.

The first stage involves the uncertainty identification, its causes and the possible impacts. Next is the treatment of uncertainties, what are the current controls in place to minimise or to eliminate uncertainties. From this, the Uncertainty Control Effectiveness is ascertained and any future treatment actions to be implemented are identified. Using the standard Uncertainty Matrix of Consequence and Likelihood, the Residual Uncertainty Rating is determined and a cost applied for the project financial exposure.

Following the *Qualitative Assessment of Project Uncertainty*, the outputs of this uncertainty assessment become the inputs into the process of *Quantitative assessment of project uncertainties*.

5.3 QUANTITATIVE ASSESSMENT OF PROJECT UNCERTAINTIES

The objective of the *Quantitative assessment of project uncertainties* is to primarily identify the *Project Components Uncertainties* and *Project Specific External Uncertainties* and then estimate the variability that occurs in a project.

The *Project Components Uncertainty* is a variability that arises from planned or known uncertainties and opportunities which represent the uncertainty in the pricing of the known scope of work. *Project Components Uncertainties* occur especially when assumptions have been made in regard to the scope, i.e. the size or type of material required for the project.

The *Project Specific External Uncertainty* is a variability that arises from external events that typically occur during the life of the project that may differ from what has been assumed in the reference estimate.

Figure 4 shows the process of typical cost build-up of a capital project cost estimate.

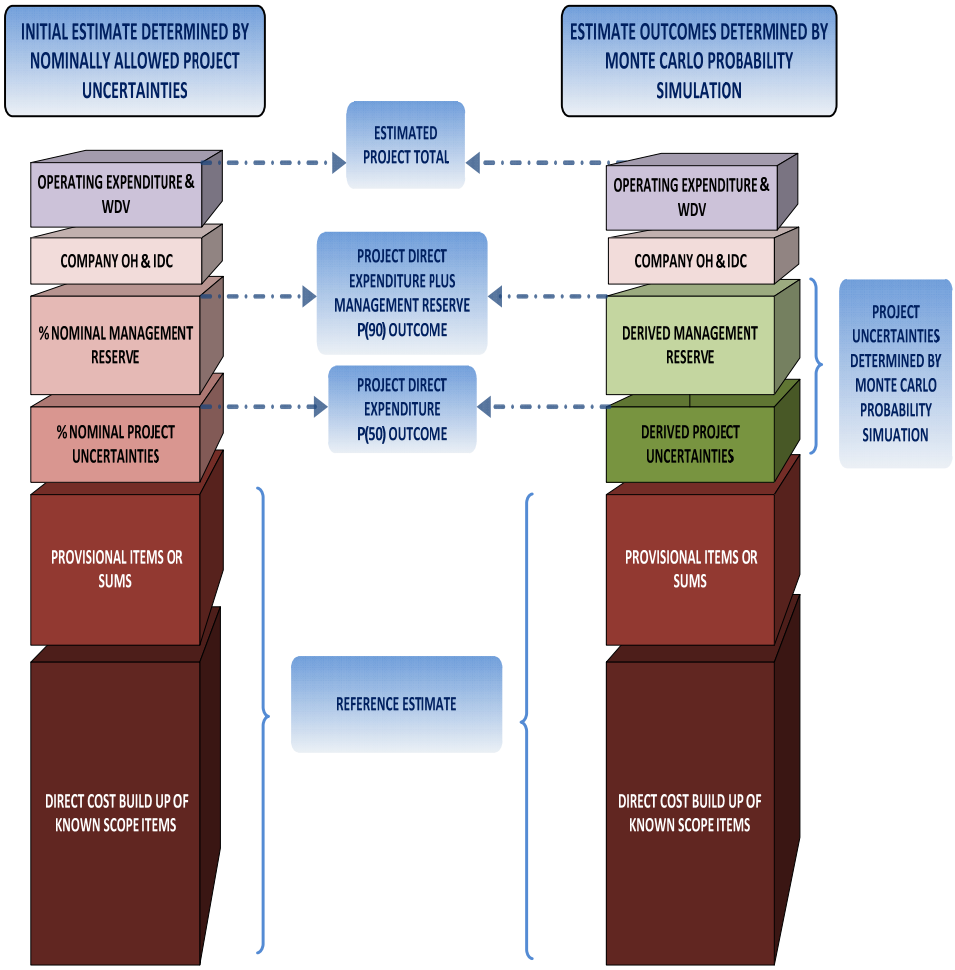


Figure 4: Typical cost build-up process of a capital project cost estimate

The inputs to the *Quantitative assessment of project uncertainties* are determined through an estimate review / interrogation performed by the appropriate parties. These parties will include the Project Sponsor / Initiator and relevant stakeholders from Asset Engineering, Project Engineering, INS Major Projects, Operations and Field Services.

The *Project Components Uncertainty analysis* is applied to the *Reference Estimate* addressing issues relevant to each individual item or activity within a project. The individual items or lines of the *Reference Estimate* are interrogated and a percentage value is applied against each item or line, based on a distribution (spread) of Minimum, Most Likely and Maximum value of that item/line, based on individual experience and collective knowledge gained from the delivery of previous projects.

The *Project Specific External Uncertainty* analysis is also applied to the *Reference Estimate* and involves the thorough review of the project to identify site specific, generic issues and project specific external environmental issues which potentially could impact on the overall project costs and timings. Using the standard Project External Uncertainty template, the Project Uncertainties, their descriptions and the consequences applicable to the *Project Uncertainties* are entered. For each individual *Project Uncertainty* identified, the cost associated with the event should it actually occur, is determined. Documented project uncertainty consequences include the detail of the outcomes and also the basis for how the cost was arrived at. For future project reviews and as a learning function, documented consequences clearly detail the reasoning as to why the cost was applied. After the cost estimate for each occurrence is determined, a percentage for the likelihood of it occurring is reviewed and entered. From this, a distribution (spread) percentage for the Minimum, Most-Likely and Maximum cost impact of this particular event occurring is allocated.

The distributions determined in both the assessment of *Project Components Uncertainty* and *Project Specific External Uncertainty* then become the basis for the *@Risk® Simulation*. The *@Risk simulation* performs a *Monte Carlo* probability calculation on the *Reference Estimate* to determine the total *Project Components* and *Project Specific External Uncertainty* costs. The *Monte Carlo* method is a technique that involves using random numbers and probability to iteratively evaluate complex, nonlinear problems. In general, 5,000 iterations are used when running the *@Risk® simulation*.

The results of the *@Risk® simulation* determine the *P(50)* and *P(90)* outcome values inclusive of *Project Components* and *Project Specific External Uncertainty costs*. The *P(50)* and *P(90)* reflect a 50% and 90% confidence level respectively that the estimate will not be exceeded at the completion of the project. These *P(50)* and *P(90)* values incorporate the following:

Derived Project Uncertainty:

> This is the difference between the value of *Reference Estimate* and the *P(50)* outcome arrived from the simulation which is inclusive of *Project Components and Project Specific External Uncertainty* costs.

Project Direct Expenditure [P(50)]:

> This is the derived *P(50)* total outcome of the simulation.

Project Direct Expenditure plus Management Reserve [P(90)]:

> This is the *P(90)* total outcome of the simulation.

Management Reserve:

> This is the difference between the *P(90)* and *P(50)* outcomes of the simulation.

6 REVIEW AND APPROVAL OF ESTIMATES

6.1 DOCUMENTATION

Detailed below is the documentation required for use in the review of each type of estimate produced.

1. *Indicative Estimate*
    - Single document detailing basis of estimate, scope of estimate, scope clarifications, options costed and indicative prices
    - Estimate summary
    - The estimate review check list
    - Sign-off
2. *Unadjusted Planning Estimate*
    - Single document detailing basis of estimate, scope of estimate, scope clarifications, the one option costed and price for this option
    - Estimate summary
    - The estimate review check list
    - Sign-off
3. *Uncertainty Adjusted Planning Estimate*
    - Single document detailing basis of estimate, scope of estimate, scope clarifications, the one option costed and prices for this option. Two figures are supplied, the *Project Direct Expenditure P(50)* and *Project Direct Expenditure plus Management Reserve P(90)*
    - *Project Uncertainty Register*
    - *Project schedule*
    - BC Summary (*Business Case* splits set out the breakdown of the estimate costs and details how the estimate costs are delivered / documented and is shown in Appendix – F: Standard Format for *Business Case* Splits.
    - The internal finance charge or *IDC* worksheet (is shown in Appendix – G: IDC Worksheet)
    - The estimate review check list
    - Sign-off

6.2 ESTIMATE REVIEW, AND CHECK LIST

Upon completion of the estimate, a review is performed by the Project Engineering, Estimating Team members and other relevant parties. Depending on the type of estimate, these can include the *INS* Major Projects Team Leader or if assigned, the nominated *Project Manager* and also members of the Engineering Team. Prior to the review, an estimate review check list is created with all information applicable to the project entered.

The estimate review check lists are shown in Appendix – H: Estimate Option Review Check List.

Depending on the type of estimate, the associated documentation and content/integrity of each estimate is reviewed. Any issues identified during the review as requiring further action are documented and assigned to the relevant person. Upon completion of the review or when the 'action' items have been addressed, the estimate review check list is signed and dated.

The signed estimate review check list is then scanned and saved in the applicable project folder. The estimate review check list is attached to *PET* when the project is ready to be advanced to the next stage.

6.3 WBS STRUCTURE

The *Work Breakdown Structure (WBS)* is used to define the separate areas or groups within the project. The structure is required to allow the allocation of funds, materials, labour and to facilitate the accurate reporting of project costs. As defined in the *Business Case* split spreadsheet, the groups include but are not limited to:

- Design
- Internal labour
- Materials
- Plant & equipment
- Contracts
- Meter costs

Allocation into the *WBS* groups is defined using *WBS Codes*. The list of *WBS Codes* for Transmission projects is shown in Appendix – I: WBS Codes.

Transmission projects contain four digit cost codes.

6.4 PRESENTATION AND HANDOVER

Following the scope and estimate review and signing off by Project Development (Appendix – J: Scope and Estimate Sign-off), the *Indicative / Planning scope and estimate* is ready for handover to the Project Sponsor, along with the estimate handover check list as shown in Appendix – K: Estimate Handover Check List.

The estimate handover check list is completed by the *Estimator* or *Project Lead* Engineer prior to the handover. At the handover, project costs are reviewed and all elements of the scope are confirmed. Any amendments or additional works required are documented as action points to be addressed. If there are no further issues or after any other issues have been resolved, the estimate handover check list is signed, scanned and is ready to be attached into *PET*.

Following the handover and signing off of the estimate handover check list, all the relevant documentation is attached into *PET*. The Project is then re-assigned in *PET* to the Project Initiator or Sponsor for *Business Case* development.

7 REFERENCES

NSD BUSINESS PROCESS MODELS:

SOP 17-16 Program / Project Lifecycle Process Map Framework Overlay

SOP 17-16 Methodology Overlay – Program / Project Lifecycle Process Diagram

SOP 17-16 Project Uncertainty Overlay – Program / Project Lifecycle Process Diagram

SOP 15-27 Manage Asset Works [T] Overlay - Program / Project Lifecycle

F2.1 Develop Broad Scope and Estimation [PE]

F2.2 Develop Detailed Project Scope [PE]

F2.3 Develop Detailed Project Estimate [PE]

SOP 15-21 Program / Project Lifecycle Project Uncertainty Management

Project Engineering Cost Estimating Manual

TRR 2014_15 to 16_17- P50 Unit Rates – Indicative Estimates – Primary, Civil, Secondary and Lines SOW & Rates

OTHER SOURCES

A Guide to the Project Management Body of Knowledge

GLOSSARY OF TERMS

Acronyms and General Definitions

AER	Australian Energy Regulator
BC	Business Case
BOM	Bill of Materials
BPO	Base Planning Objects
BPR	Base Planning Rates
CPI	Consumer Price Index
D&C	Design & Construct
DSP	Design Services Provider
EPM	Enterprise Project Management
FEED	Front End Engineering Design
GA	General Arrangement
IDC	Interest During Construction
INS	Integrated Network Services Group
ISP	Installation Services Provider
IT	Information Technology
LAHA or LAFHA	Living Away From Home Allowance
MPM	Manager Project Management
NER	National Electricity Rules
NOC	Network Operation Centre
NSD	Networks Strategy & Development Group
NPV	Net Present Value
PCEM	Project Cost Estimating Manual
PD	Project Development
PET	Project Execution and Tracking
PFT	Project Forecasting Tool
PMBOK®	Project Management Body of Knowledge
PMO	Project Management Office
PM	Project Manager
PSO	Projects Support Office
SLD	Single Line Diagram
SPN	SP AusNet
TOC	Transmission Operation Centre
TNSP	Transmission Network Service Provider
WBS	Work Breakdown Structure
@RISK®	Excel Bases Simulation Software

Proposed changes for quick reference

PROPOSED TERM	PREVIOUSLY USED TERM
Cost Escalation	Escalation
Implementation Phase	Execution Phase
Management Reserve	Contingency
Project Component Uncertainty	Inherent Risk
Project Direct Expenditure Plus Management Reserve P(90)	Project Direct Expenditure Plus Risk P(90)
Project External Uncertainty	Contingent Risk
Project Operation Manual	Project Execution Manual
Project Uncertainty	Risk
Quantitative Assessment of Project Uncertainty	Quantitative Risk Assessment
Uncertainty Adjusted Planning Estimate	Risk Adjusted Planning Estimate

Activity Code: One or more numerical or text values that identify characteristics of the work or in some way categorise the schedule activity that allows filtering of activities within estimate.

Activity: An element of work performed during the course of a project. An activity normally has an expected duration, cost and resource requirement. Activities can be subdivided into tasks.

Actual Cost: The final out-turn dollar expenditure on a project.

Assumptions: Assumptions are factors that, for planning purposes, are considered to be true, real, or certain without proof or demonstration.

Base Date: The calendar date at which the current project estimate has been calculated, (i.e. before apply any escalation).

Base Planning Object: A Unit Cost for an installed asset assembly and / or functional element.

Bottom-Up Estimation [Process]: A method of estimating a component of work. The work is decomposed into more detail. An estimate is prepared of what is needed to meet the requirements of each of the lower, more detailed pieces of work, and these estimates are then aggregated into a total quantity for the component of work.

Budget: The approved estimate for the project or any work breakdown structure component or any schedule activity. See estimate.

Business Case [Process]: A Business Case captures the reasoning and Objectives for initiating a project and provides approval to proceed for design and implementation. It is often presented in a well-structured written document.

Construction / Contract Budget: The contractor's tendered price plus an allowance for the Principal's costs. Principal's costs include project management, site supervision, operational costs, etc.

Contract [Output/Input]: A contract is a mutually binding agreement that obligates the seller to provide the specified product or service or result and obligates the buyer to pay for it.

Contractor Indirect: An allowance that includes the contractor's corporate costs. Indirect costs are those costs that cannot be directly traced to a specific project and therefore will be accumulated and allocated equitably over multiple projects by some approved and documented accounting procedure.

Control Estimate: The budget estimate prepared for the project implementation phase, subsequent to completion of a detailed scope of works and detailed design documentation using a standard Bottom-up Estimating in the Expert Estimation. The control estimate is used to monitor the status of the project to update the project budget and manage changes to the cost baseline.

Corrective Action: Documented changes made to bring expected future performance of the project work into line with the project plan.

Cost Budgeting: Allocating the cost estimate to individual project components or WBS.

Cost Codes: Numerical values that identify characteristics of the work or in some way categorise the schedule activities, e.g. 1000 for Project Establishment, 2000 for Project Management. *See also Work Breakdown Structure (WBS).*

Cost Control: Controlling changes to the project budget.

Cost Escalation: The anticipated changes in the costs or price of specific goods or services in a given economy over a period. This is a similar to the concepts of inflation and deflation except that escalation is specific to an item or class of items (not as general in nature). e.g. Currency exchange rates, Commodity prices.

Cost Estimating [Process]: Cost Estimation is the process of developing an approximation of the monetary resources needed to complete project activities.

Cost-Plus-Fixed (CPFF) Contract: A type of cost reimbursable contract where the buyer reimburses the service provider for the service provider's allowable costs (defined in the contract), plus a fixed amount of profit (fee).

Cost-Reimbursable Contract: A type of contract involving payment to the service provider for the service provider's actual costs, plus a fee typically representing service provider's profit.

Cost Variance: Any difference between the estimated cost and the actual cost.

Deliverable: Any measurable, tangible, verifiable outcome, output, result or item that must be produced to complete a project or part of a project or phase.

Direct Costs: Costs that can be directly attributed to the work being performed or services being received. For construction, it refers to the costs of constructing the physical project activities (resource costs of plant, labour, materials and subcontract).

Earned Value (EV): A method of measuring project performance. It compares the amount of work that was planned with what was actually accomplished to determine if cost and schedule performance is as planned.

Effort: The amount of labour or gang units needed to complete a scheduled activity or WBS component, usually expressed as staff hours, staff days, and staff weeks.

Engineering Consultation Review [Process]: A review of a project to achieve concurrence (agreement) on the project scope and cost.

Estimate (Output/Input): A quantitative assessment of the likely amount or outcome. It is usually preceded by a modifier (i.e. Indicative Estimate, Planning Estimate, and Control Estimate).

Estimate to Complete: The expected additional cost needed to complete an activity, a group of activities or the project.

Expert Estimation®: A resource-based estimating program or software package provided by Vendor Pronamics in the preparation of project estimates used by Project Engineering in SP AusNet.

Implementation Phase: The phase that follows the initiation phase and the planning phase (approval of the business case), during which the preferred option is developed into a detailed design and tenders called.

Indicative Estimate [Process]: A budget estimate developed for a project from initial concepts. Often the information is very vague with only a single line or broad functional requirement. The indicative estimation process provides approximate costs for the determination of project feasibility, options analysis and selection.

Indirect Costs: Costs those are not directly attributable to work items. For a construction project, these costs include on-site overheads. e.g. administration, site supervision, site facilities, off-site overheads costs etc.

Inflation: An allowance for the rising cost of the project due to rise in the general level of prices of goods and services in an economy over a period of time.

Initiation Phase: The initial phase of a project during which project high level scope is defined and a Qualitative and Quantitative Project Uncertainty Assessment is undertaken. This phase commences with the development of a project proposal and concludes with the regulatory or management approval to commence the planning phase. General consultation with stakeholders commences during this phase.

Issue: A point or matter in question or in dispute.

LAHA: Living Away From Home Allowance; sometime also refers as LAFHA

Lessons Learned: The learning gained from the process of performing estimation and associated activities of a project.

Material: The aggregate of things used in projects, such as equipment, gear, consumable material.

Management Reserve: An amount of funds, budget, or time needed above the estimate to cover the costs of unforeseen factors related to the delivery of the project objectives, which are not provided for elsewhere in the total job costs. Management Reserve is to be administered at program level. These can include but are not limited to the occurrence of an unplanned or unforeseen event such as a natural event or a major safety incident and the change to planned assumptions, stakeholder issues (outage restrictions, community) and delayed access to site, industrial relations issues external to the Project / Program, and contractual issues or claims.
It is the difference between P(90) and P(50) outcomes.

Methodology: A system of practices, techniques, procedures and rules used by Project Engineering in developing project scope, design and estimate.

Monte Carlo Simulation [Process]: A process which generates hundreds or thousands of probability performance outcomes based on probability distributions for cost and schedule on individual tasks. The outcomes are then used to generate a probability distribution for the project as whole.

Objective: Something toward which work is to be directed, a strategic position to be attained, or a purpose to be achieved, a result to be obtained, a product to be produced, or service to be performed.

P(50) Estimate: An estimate prepared at any stage of a project which has a 50% confidence factor of not being exceeded by cost at completion.

P(90) Estimate: An estimate prepared at any stage of a project which has a 90% confidence factor of not being exceeded by cost at completion.

The P50 Unit Rates: These have been prepared to assist with the development of cost estimates for the Transmission Revenue Reset submission. These rates have been extracted from the SP AusNet top-down estimating model based on typical bay and component costs, adopting certain assumptions.

The P50 unit rates have been prepared primarily for estimating at a high level and do not replace the standard estimating process used during project development. i.e. these rates do not replace estimates prepared in accordance with SP AusNet Specifications and Standards.

Planning Estimate [Process]: A budget estimate prepared during Planning Phase. The Planning Estimation process provides the further development of options considered during Initiation Phase for project options analysis and selection. Once a final option has been chosen the Planning Estimate is risk adjusted and used for financial / Business Case approval.

Planning Phase: The phase of a project during which a project scope is defined, Qualitative and Quantitative Project Uncertainty Assessments are undertaken. This phase commences with the development of a project proposal and planning estimate and concludes with the approval of the business case. More detailed consultation with stakeholders commences during this phase.

Project Components Uncertainty [Process]: Project Components Uncertainty is a calculation (or estimate) of the variability that occurs in all projects. This variability arises from uncertainty in pricing or volumes of component activities. The uncertainties are a portion of the difference between the outturn and assumptions in the reference estimate.

Project Components Uncertainties can include but are not restricted to the uncertainty in the scope of work, the uncertainty, or potential variations, in quantities and unit rates proposed in the direct estimate, and variations in construction methods used.

Project Cost Management [Process]: A subset of project management that includes the processes required to ensure that the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting and cost control.

Project Direct Expenditure P(50): This is the estimated P(50) total value. *See P(50) Estimate.*

Project Direct Expenditure Plus Management Reserve P(90): This is the estimated P(90) total value. *See P(90) Estimate.*

Project Estimate: The total estimated costs of a project in outturn dollars for all components of a project from the commencement of the initiation phase to the end of the close-out phase.

Project External Uncertainty [Outcome]: Project External Uncertainty is a calculation (or estimate) of the variability that arises from external events that typically occur during the life of the Project. The uncertainty is a portion of the difference between the outturn and what has been assumed in the reference estimate.
The occurrence of an unplanned or unforeseen event such as a natural event or a major safety incident, the change to planned assumptions, stakeholder issues (outage restrictions, community), the availability of resources or materials, delayed access to site, industrial relations issues external to the Project / Program, and contractual issues or claims.

Project Life Cycle: The total duration of a project normally dissected into sequential phases (initiation, planning, implementation and close-out).

Project Operation Manual: SP AusNet's framework that provides the direction and guidance for effective management and delivery of projects.

Project Uncertainty: Project Uncertainty is the sum of Project Components Uncertainty and Project Specific External Uncertainty.

Provisional Items or Provisional Sums: Items or sums that should be included in an estimate when the designer knows that work is required but cannot quantify it. e.g. planning permit application, rock excavation and soil disposal, exact number of existing drawings to be cancelled without performing a detailed design.

Quantitative Assessment of Project Uncertainty [Process]: The objective of the Quantitative Assessment of Project Uncertainty is to identify both the Project Components and Project Specific External Uncertainties.

Reference Estimate [Outcome]: Direct cost build-up of known scope items including provisional items or provisional sums.

Resource Planning [Process]: Determining what resources (plant, labour and materials) are needed in what quantities to perform project activities.

Scope Creep: Increase in work required to meet a previously given outcome. Adding features and functionalities without addressing the effects on time, costs, and resources, or without customer/sponsor approval.

Scope: The sum of the products, services, and results to be provided as a project.

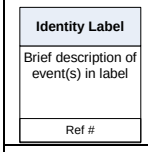
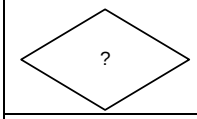
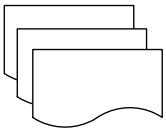
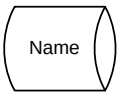
Simulation: A simulation uses a project model that translates the uncertainties specified at a detailed level into their potential impact on objectives that are expressed at the level of the total project. Project simulations use computer models and estimates of uncertainty, usually expressed as a probability distribution of possible costs or durations at a detailed work level, and are typically performed using Monte Carlo analysis.

Uncertainty-Adjusted Planning Estimate: An estimate prepared towards the end of a project's Initiation phase after the options analysis, for the purpose of evaluating the project in the business case. The estimate, which is based on the preferred option of the functional scope, forms the basis of funding approval. It is expressed in present day dollars.

Unit Cost: *See Base Planning Object*

Work Breakdown Structure (WBS) [Output/Input]: A deliverable oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. It defines and groups a project' discrete work elements in a way that helps organise and define the total scope of work of the project.
See also Cost Code

The following symbols are used in the NSD process diagrams in this document.

Symbol	Description
	Process start and stop symbol
	Directional arrow on a process or event diagram
	Process symbol also a referred Process. This box will break down into Events.
	Event symbol. Events occur within a process. This box will not break down further OR Is not broken down further in this set of documentation
	Decision point
	Data source required as input to an event
	System symbol. The system accessed for data and/or used to perform an event step.

8 APPENDICES

See next page
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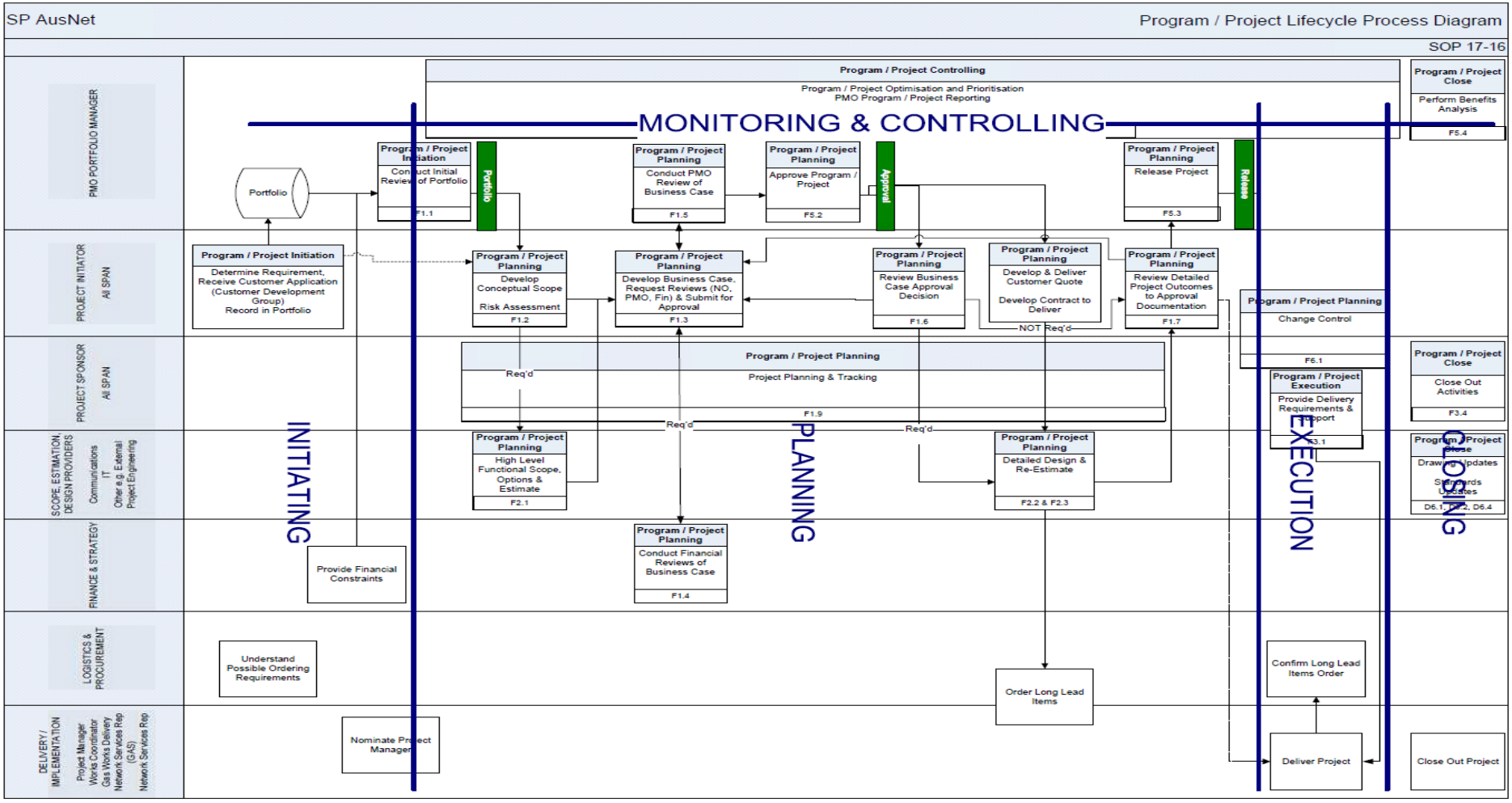
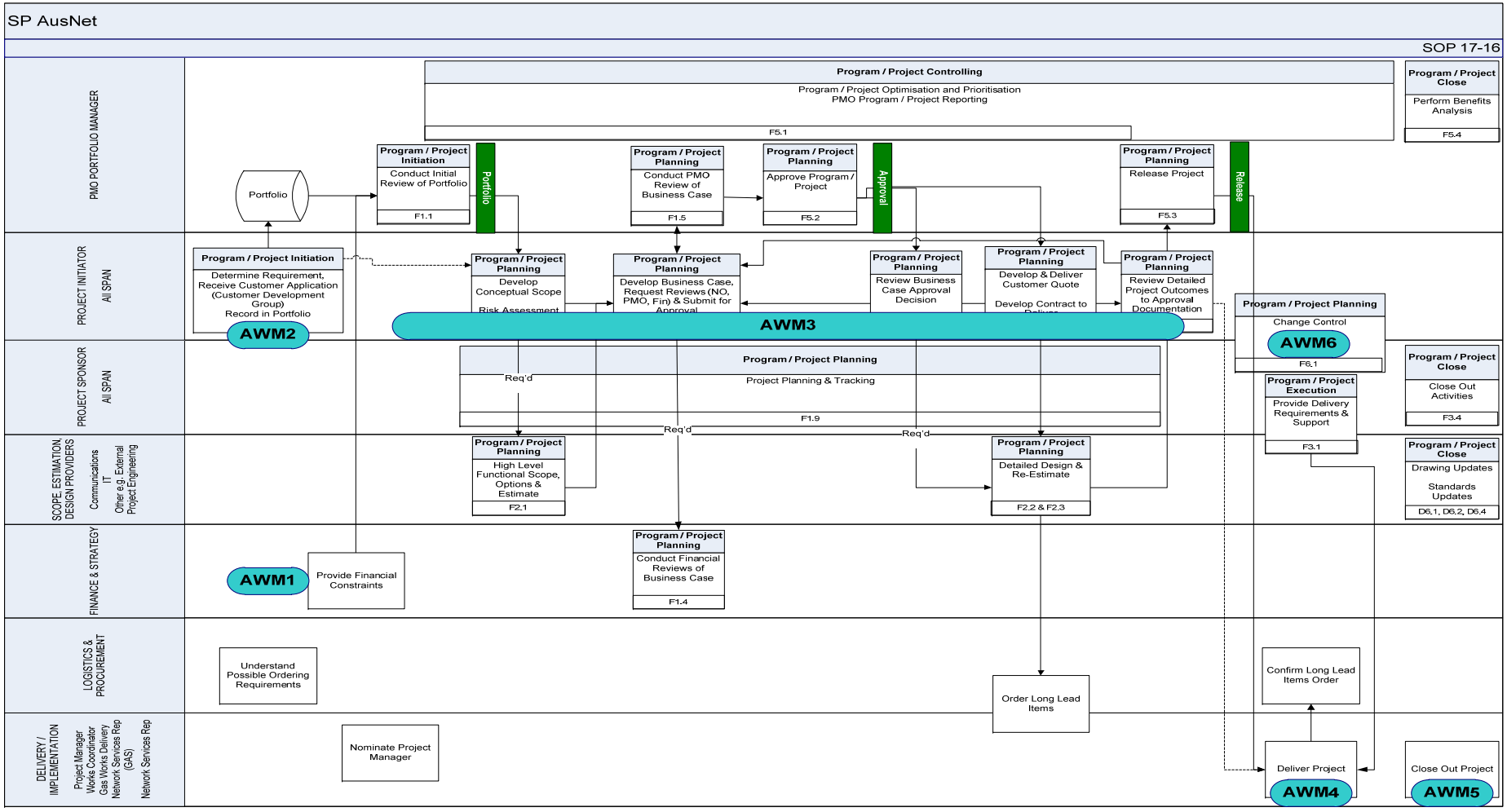
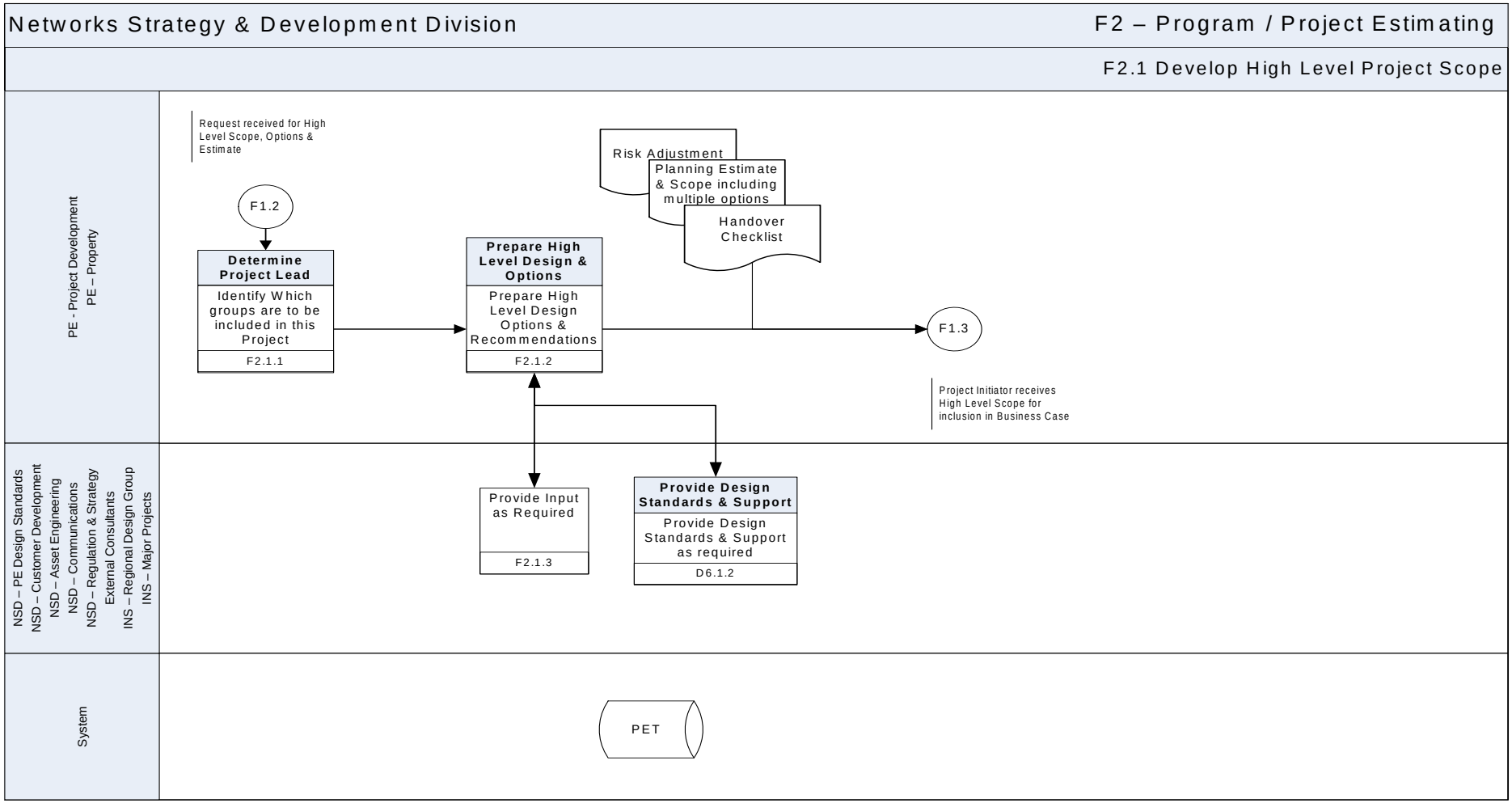
APPENDIX – A: PROGRAM / PROJECT LIFECYCLE PROCESS MAP FRAMEWORK OVERLAY



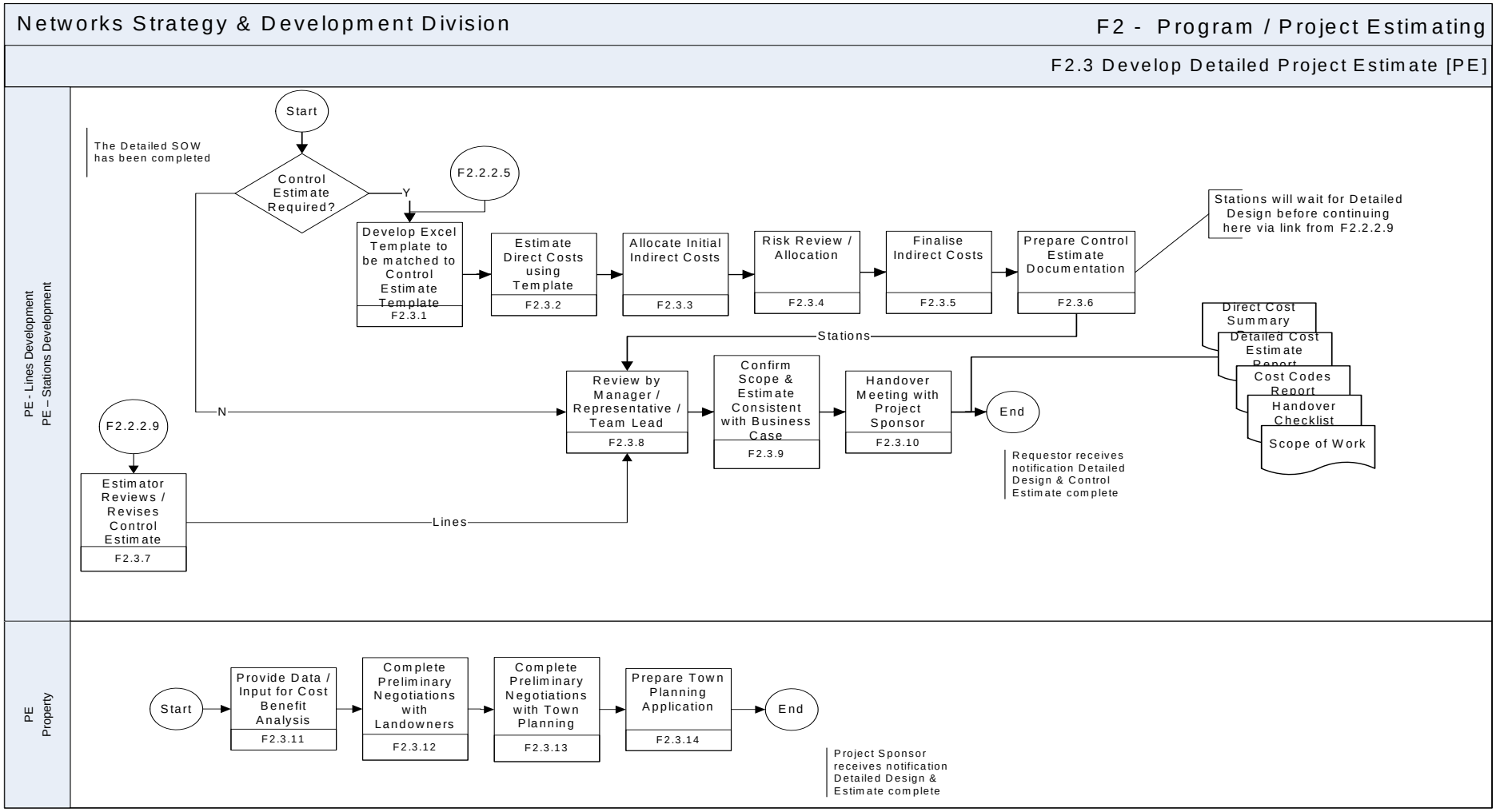
APPENDIX – B: SOP 17-16 METHODOLOGY OVERLAY – PROGRAM / PROJECT LIFECYCLE PROCESS DIAGRAM



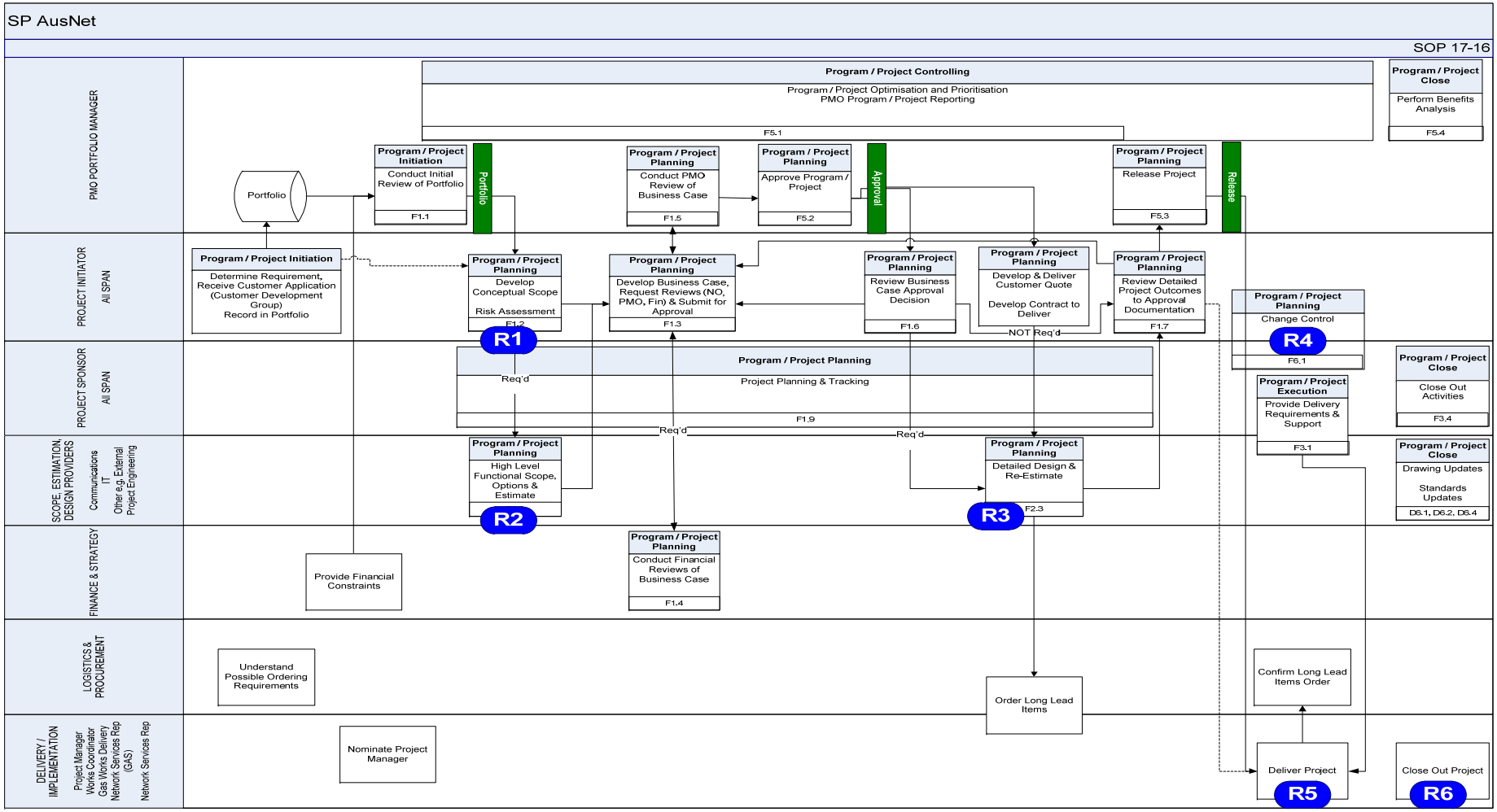
APPENDIX – C: F2.1 DEVELOP HIGH LEVEL PROJECT SCOPE



APPENDIX – D: F2.3 DEVELOP DETAILED PROJECT ESTIMATE



APPENDIX – E: SOP 17-16 PROJECT UNCERTAINTY OVERLAY - PROGRAM PROJECT LIFECYCLES PROCESS MAP



APPENDIX – F: STANDARD FORMAT FOR BUSINESS CASE SPLITS

					STAGES	
					0	0
	PROJECT EXPENDITURE FORECASTS	2008/09	2009/10	2010/11		
1	DESIGN	$0	$0	$0	$0	$0
2	INTERNAL LABOUR	$0	$0	$0	$0	$0
3	MATERIALS	$0	$0	$0	$0	$0
4	PLANT & EQUIPMENT	$0	$0	$0	$0	$0
5	CONTRACTS	$0	$0	$0	$0	$0
6	METER COSTS	$0	$0	$0	$0	$0
7	OTHER - PROJECT UNCERTAINTY ALLOWANCE (P50)	$0	$0	$0	$0	$0
8	**PROJECT DIRECT EXPENDITURE P(50)**	**$0**	**$0**	**$0**	**$0**	**$0**
9	MANAGEMENT RESERVE (P90)	$0	$0	$0	$0	$0
10	**PROJECT DIRECT EXPENDITURE PLUS MANAGEMENT RESERVE P(90)**	**$0**	**$0**	**$0**	**$0**	**$0**
11	OVERHEADS	$0	$0	$0	$0	$0
12	FINANCE CHARGES (IDC)	$0	$0	$0	$0	$0
13	OPERATING EXPENDITURE	$0	$0	$0	$0	$0
14	WRITTEN DOWN VALUES	$0	$0	$0	$0	$0
15	TOTAL EXPENDITURE FOR APPROVAL	$0	$0	$0	$0	$0

APPENDIX – G: IDC WORKSHEET

FINANCE CHARGES & OVERHEADS CALCULATION SHEET

ENTER START YEAR FOR PROJECT: 2010/11

Prj. No: 0

Please ensure to Sarcode the final WIP balance at end of project by typing the amount into the Sarcoded column.

Business (pls select)	Transmission
CFC	8.20%
OHD	7.00%
Design	$0
Internal Labour	$0
Materials	$0
Plant & Equipment	$0
Contracts	$0
Meter Costs	$0
Nominal Risk Allowance	$0
TOTAL DIRECTS	$0

	Years	Month	Design	INT	MAT	PLT	CONTR	MET	RISK	Project Direct Expenditure	Overhead	Accumulative WIP Balance	Transferred into Asset (Sarcoded)	Customer Contribution rec'd into Trust	Finance Charges
Current Financial Yr	2010/11	Apr								$0	-	-			-
		May								$0	-	-			-
For A to P:		Jun								$0	-	-			-
Direct	-	Jul								$0	-	-			-
Overheads	-	Aug								$0	-	-			-
Finance Charges	-	Sep								$0	-	-			-
	-	Oct								$0	-	-			-
		Nov								$0	-	-			-
		Dec		$0						$0	-	-			-
		Jan	$0	$0						$0	-	-			-
		Feb	$0	$0						$0	-	-			-
		Mar	$0	$0						$0	-	-			-
Following Financial Yr	2011/12	Apr	$0	$0						$0	-	-			-
		May	$0	$0						$0	-	-			-
For A to P:		Jun	$0	$0	$0					$0	-	-			-
Direct	-	Jul	$0	$0	$0					$0	-	-			-
Overheads	-	Aug	$0	$0				$0	$0	$0	-	-			-
Finance Charges	-	Sep	$0	$0	$0	$0	$0	$0	$0	$0	-	-			-
	-	Oct		$0	$0	$0	$0	$0	$0	$0	-	-			-
		Nov		$0		$0	$0	$0	$0	$0	-	-			-
		Dec		$0	$0	$0	$0	$0	$0	$0	-	-			-
		Jan		$0	$0	$0	$0	$0	$0	$0	-	-			-
		Feb		$0		$0	$0		$0	$0	-	-	-		-
		Mar		$0		$0	$0		$0	$0	-	-			-
Following Financial Yr	2012/13	Apr		$0		$0	$0		$0	$0	-	-			-
		May		$0					$0	$0	-	-			-
For A to P:		Jun		$0						$0	-	-			-
Direct	-	Jul								$0	-	-			-
Overheads	-	Aug								$0	-	-			-
Finance Charges	-	Sep								$0	-	-			-
	-	Oct								$0	-	-			-
		Nov								$0	-	-			-
		Dec								$0	-	-			-
		Jan								$0	-	-			-
		Feb								$0	-	-			-
		Mar								$0	-	-	-		-
Following Financial Yrs	2013/14	Full Yr								$0	-	-			-
	2014/15	Full Yr								$0	-	-			-
Total										$ -	$ -		$ -	$ -	$ -
	2010/11	Full Yr	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	2011/12	Full Yr	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	2012/13	Full Yr	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
			OK	OK	OK	OK	OK	OK	OK						

Cash flow amount should equal the total directs as shown on page 1 of the A to P

Business	CFC	OHD
Transmission	8.2%	7.0%

APPENDIX – H: ESTIMATE OPTION REVIEW CHECK LIST

2. OPTIONS REVIEW CHECKLIST

THIS CHECKLIST IS TO BE COMPLETED BEFORE SUBMISSION OF PREFERRED OPTION

PROJECT DESCRIPTION:			
2.1.1	PROJECT NUMBER	*****	
2.1.2	PROJECT SITE	*****	
2.1.3	PROJECT DESCRIPTION	*****	
2.1.4	CONNECTED PARTY / CUSTOMER	*****	
2.1.5	SP AUSNET CUSTOMER CONTACT	*****	
OPTIONS REVIEW MEETING DETAILS:			
2.2.1	REVIEW MEETING DATE:	*****	
2.2.2	PROJECT ENG REPRESENTATIVE(S)	*****	
2.2.3	CUST / SPONSOR REPRESENTATIVE(S)	*****	
2.2.4	ASSET ENG REPRESENTATIVE(S)	*****	
2.2.5	INS PROJECTS REPRESENTATIVE(S)	*****	
2.2.5	DOCUMENT REVISION IN REVIEW	*****	
SCHEDULE DETAILS			
2.3.1	ESTIMATED TIME FOR DESIGN COMPONENT:	***** Months	
2.3.2	ESTIMATED TIME FOR CONSTRUCTION DELIVERY:	***** Months	
CONSTRUCTION DETAILS			
2.4.1	SINGLE LINE DIAGRAMS & LAYOUTS:	AGREED	
2.4.2	SITE BOUNDARIES / EASEMENTS:	NO CHANGE	
2.4.3	PLANNING PERMIT REQUIRED:	NO	
2.4.4	SITE LAY DOWN & TEMP BUILDINGS LOCATION (INCL SECURITY):	USE EXISTING FACILITIES	
2.4.5	PROJECT SEQUENCE / SCHEDULE ESTABLISHED:	NOT REQUIRED	
2.4.6	OUTAGE PLAN ESTABLISHED:	NOT REQUIRED	
2.4.7	EQUIPMENT TRANSPORT TO FINAL POSITION:	OK	
2.4.8	EQUIPMENT CONSTRUCTION CLEARANCE / CRANAGE	OK	
2.4.9	TEMPORARY WORKS IDENTIFIED:	NO TEMPORARY WORKS	
2.4.10	NON-STANDARD ARRANGEMENTS IDENTIFIED:	ALL STANDARD	
2.4.11	SECONDARY / AUX SUPPLIES SCOPE & SEQUENCE PROVIDED:	PROVIDED	
2.4.12	SPECIAL HEALTH & SAFETY ISSUES:	NO SPECIAL ISSUES	
2.4.13	ENVIRONMENTAL ISSUES:	NO SPECIAL ISSUES	
OPERATIONAL ISSUES			
2.5.1	OPERATOR ACCESS DURING CONSTRUCTION:	NO CHANGES REQD	
2.5.2	EQUIPMENT OPERATION PROCEDURES / CLEARANCE / TRAINING	NO CHANGES REQD	
2.5.3	YARD SURFACE, DRAINAGE, FIRE SERVICE & LIGHTING:	NO CHANGES REQD	
2.5.4	NORMAL AND EMERGENCY ACCESS:	NO CHANGES REQD	
MAINTENANCE ISSUES			
2.6.1	MAINTENANCE ACCESS DURING CONSTRUCTION:	NO CHANGES REQD	
2.6.2	SUITABLE ACCESS / CLEARANCE FOR EQUIPMENT MAINTENANCE	NO CHANGES REQD	
2.6.3	EQUIPMENT REQUIRED FOR MAINTENANCE IDENTIFIED:	IDENTIFIED	
2.6.4	OUTAGES FOR MAINTENANCE IDENTIFIED:	IDENTIFIED	
2.6.5	HEALTH & SAFETY ISSUES (HEIGHTS, CONFINED SPACE, ETC):	NO SPECIAL ISSUES	
2.6.6	ENVIRONMENTAL ISSUES:	NO SPECIAL ISSUES	
2.6.7	MAINTENANCE EXPERTISE & TRAINING:	STANDARD EQ ONLY	
MEETING ACTIONS			
2.7.1	MEETING ACTIONS IDENTIFIED & AGREED:	YES	
2.7.2	FOLLOW-UP MEETING REQUIRED?	NO	
2.7.3	CHECKLIST COMPLETED BY:	Name: → *****	

2. OPTIONS REVIEW CHECKLIST

	Signature:	Date:

ACTIONS ARISING FROM REVIEW:

ITEM	ACTION REQUIRED	ACTION BY:	DATE:
2.8.1			
2.8.2			
2.8.3			
2.8.4			
2.8.5			
2.8.6			
2.8.7			
2.8.8			
2.8.9			
2.8.10			
2.8.11			
2.8.12			
2.8.13			
2.8.14			

APPENDIX – I: WBS CODES

Transmission & Distribution WBS Codes		
Transmission COST CODE	COST CODE DESCRIPTION	Distribution COST CODE
1000	Project Establishment	100
1100	Project Establishment Costs	110
1200	Property - Leasing, Purchase, Temp Set Up & Running Costs	120
2000	Project Management	200
2100	Project Management Costs	210
2200	Project Engineering Costs	220
3000	External Design	300
3100	Primary Design - External	310
3200	Secondary Design - External	320
3300	Civil Design & Drafting - External	330
3400	Communication Design & Drafting - External	340
3500	Line Design & Drafting - External	350
3600	Underground Design & Drafting - External	360
3700	SCADA Design & Drafting - External	370
3800	Engineering Support	380
3810	Primary - Engineering Support	381
3820	Secondary - Engineering Support	382
3830	Civil - Engineering Support	383
3840	Communication - Engineering Support	384
3850	Line - Engineering Support	385
3860	Underground - Engineering Support	386
3870	SCADA Design & - Engineering Support	387
4000	Procurement	400
4100	Primary Materials	410
4200	Secondary Materials	420
4300	Structural Materials	430
4400	Communication Materials	440
4450	SCADA Materials	445

Transmission & Distribution WBS Codes		
Transmission COST CODE	COST CODE DESCRIPTION	Distribution COST CODE
4500	Line Materials	450
4600	66kV Line Materials	460
4700	22kV Line Materials	470
4800	66kV Underground Materials	480
4900	22kV Underground Materials	490
5000	Construction	500
5050	Construction Establishment Costs	505
5100	Primary Installation	510
5200	Secondary Installation	520
5300	Civil Installation	530
5400	Communication Installation	540
5450	SCADA Installation	545
5500	Line Installation	550
5600	66kV Line Installation	560
5700	22kV Line Installation	570
5800	66kV Underground Installation	580
5900	22kV Underground Installation	590
6000	Test & Commissioning	600
6100	Primary Test & Commissioning	610
6200	Secondary Test & Commissioning	620
6400	Communication Test & Commissioning	640
6450	SCADA Test & Commission	645
6500	Lines Test & Commissioning	650
6600	Yarraville Test & Network Development	660
7000	Retirement & Dismantle	700
7100	Primary Retirement & Dismantle	710
7200	Secondary Retirement & Dismantle	720
7300	Civil Retirement & Dismantle	730
7400	Communications Retirement & Dismantle	740
7500	Lines Retirement & Dismantle	750
7600	Underground Retirement & Dismantle	760

Transmission & Distribution WBS Codes		
Transmission COST CODE	COST CODE DESCRIPTION	Distribution COST CODE
9000	Project Closeout	900
9100	Project Closeout Costs	910
CFIN	Finance Charges (incl IDC)	CFIN
CONT	Project Contingency	CONT
MSCN	Misallocations	MSCN
OVER	Overheads	OVER
RISK	Risk	RISK

APPENDIX – J: SCOPE AND ESTIMATE SIGN-OFF

<Project No and name?>
Sign Off Rev <?>

Document Details	
Version Number	
Status	Approved
Author	
Date Published	
File Name & Location	

Authorisation			
Reviewed By	Role	Signature	Date
	Project Lead		
	Technical Reviewer/s		
	Estimate Reviewer/s		

Authorisation			
Approved By	Role	Signature	Date
	Manager Project Development		

APPENDIX – K: ESTIMATE HANDOVER CHECK LIST

4. HIGH LEVEL ESTIMATE AND SCOP CHECKLIST

THIS CHECKLIST IS TO BE COMPLETED WHEN AN ESTIMATE IS READY FOR HANDOVER TO THE CUSTOMER.
THE CHECKLIST SHOULD BE COMPLETED ELECTRONICALLY, PRINTED SIGNED, SCANNED AND SAVED IN THE ESTIMATION DIRECTORY.

PROJECT DESCRIPTION:			
4.1.1	PROJECT NUMBER	*****	
4.1.2	PROJECT SITE	*****	
4.1.3	PROJECT DESCRIPTION	*****	
4.1.4	CONNECTED PARTY / CUSTOMER	*****	
4.1.5	SP AUSNET CUSTOMER CONTACT	*****	
REVIEW MEETING DETAILS:			
4.2.1	MEETING DATE:	*****	
4.2.2	NSD STATIONS DEV REPRESENTATIVE	*****	
4.2.3	NSD LINES DEV REPRESENTATIVE	*****	
4.2.4	NSD CUSTOMER REPRESENTATIVE	*****	
4.2.5	INS PROJECTS REPRESENTATIVE	*****	
ESTIMATE DETAILS			
4.3.1	ESTIMATE PREPARED BY:	*****	
4.3.2	ESTIMATE TYPE SUPPLIED:	PLANNING	
4.3.3	ESTIMATE REVISION REVIEWED:	REVISION A	
4.3.4	SINGLE LINE DIAGRAMS & LAYOUTS:	IN ACCORDANCE WITH SPA AND CUSTOMER REQTS	
	COMMENT:	*****	
4.3.5	BASIS OF ESTIMATE	SCALE FROM PREVIOUS PROJECT	
4.3.6	FORCASTED CASH FLOW PERIOD:	*****	
4.3.7	PROJECTS USED AS REFERENCE / BASIS	*****	
4.3.8	RISK ADJUSTED?	YES	
4.3.9	SITE BOUNDARIES / BAYS / CURRENT RESOURCES	DETAILED IN PLANNING REPORT	
	COMMENT:	*****	
4.3.10	SCOPE OF ESTIMATE	INCLUDED IN PLANNING REPORT	
	COMMENT:	*****	
4.3.11	CONSTRUCTABILITY MEETING	COMPLETED (MINUTES ATTACHED)	
	COMMENT:	*****	
4.3.12	EXCLUSIONS / CLARIFICATIONS	INCLUDED IN DETAILED SCOPE	
	COMMENT:	*****	
4.3.13	CONNECTED PARTY RESPONSIBILITIES	INCLUDED IN DETAILED SCOPE	
	COMMENT:	*****	
4.3.14	COST ESTIMATE PROVIDED	YES	
	COMMENT:	*****	
4.3.15	TIME FOR DELIVERY INCLUDED	YES	
	COMMENT:	*****	
REVIEW DETAILS			
4.4.1	CHECKLIST COMPLETED BY:	Name: → *****	
	Signature:	Date: → *****	

4. HIGH LEVEL ESTIMATE AND SCOP CHECKLIST

ACTIONS REQUIRED PRIOR TO ESTIMATE SUBMISSION:			
ITEM	ACTION REQUIRED	ACTION BY:	DATE:
4.5.1			
4.5.2			
4.5.3			
4.5.4			
4.5.5			
4.5.6			
4.5.7			
4.5.8			
4.5.9			
4.5.10			
4.5.11			
4.5.12			