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Project Estimate Review Procedure

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Table of Contents

1.0 PURPOSE

This procedure provides guidelines for preparing and conducting of formal estimate reviews, which will include a formal written estimate review package. The estimate review package format provides a consistent, systematic, and thorough means of documenting and presenting a cost estimate for internal reviews. This procedure applies to works performed under all Government construction projects executed throughout the Kingdom of Saudi Arabia.

Estimate reviews are intended to:

- Communicate to Stakeholders the basis and methodology of the estimate.
- Ensure that the project objectives are met.
- Verify that the correct processes have been followed during estimate development.
- Validate that the estimate properly reflects the project scope, execution plan and schedule.
- Assumptions.

2.0 SCOPE

This procedure applies to all classes of estimates. Depending on the purpose, scope, size, and sensitivity of a project and cost estimate, the contents and level of detail of the estimate review package will vary.
All estimates that result in a commitment of an Entity must be reviewed in accordance with this procedure.

Estimate review packages must be prepared for the following estimate reviews:

- Project/proposal team review
- Entity management review
- Entity Senior management review

Some of these reviews may be combined based on the project's scope, size, and perceived risks. The participants involved in the reviews and the number of reviews may also vary between the Entities.

3.0 DEFINITIONS

Definitions	Description
APM	Assistant Project Manager
C/M	Construction Management
EPC	Engineering, Procurement & Construction
EPCM	Engineering, Procurement & Construction Management
ICE	International Electrotechnical Commission
LD	Liquidated Damages
LNTP	Limited Notice to Proceed. Given to progress the project and maintain schedule while awaiting full funding approval.
LOC	Letter of Credit
LSTK	Lump Sum Turnkey (Fixed Price contract)
MSS	Manufacturers Standardization Society of the Valves and Fittings Industry
NTP	Notice to Proceed
NFPA	National Fire Protection Association
OOM	Order of Magnitude (Estimate)
PCE	Project Controls Engineer
PCM	Project Controls Manager
PE	Project Estimator
PM	Project Manager
PMS	Proposal Management Schedule
RFP	Request for Proposal
SEC	Saudi Electricity Company
SM	Site Manager

Definitions	Description
UR	Unit Rates
Contractor	One that agrees to furnish materials or perform services at a specified price, especially for construction work.
Entity	A Saudi Government organization which is responsible for the delivery of government funded infrastructure construction projects..
Guarantee	A guarantee that has been issued is security for one party's performance. If that party (typically the Contractor) fails to perform, the beneficiary under guarantee (typically the Entity) may obtain payment.
Stage Gates	A Gated Project Execution Process that is designed to help Project Managers successfully organize, plan, set up, and execute infrastructure projects.
Target	Under a target price contract, a contractor is reimbursed for the all the costs of the work up to the target value. Excluding changes.

4.0 REFERENCES

1. EPM-KPC-PR-000001 - Project Cost Coding Structures Procedure.
2. EPM-KPP-PR-000001 - Project Planning and Scheduling Definitions and Concept Procedure.
3. EPM-KPE-PR-000001 - Project Estimate Types Procedure.
4. EPM-KPE-PR-000002 - Project Estimating Coding Procedure.
5. EPM-KPE-PR-000003 - Project Estimate Methodology / Development Procedure.
6. EPM-KPE-PR-000005 - Project Estimate Approval Procedure.
7. EPM-EQ0-PR-000001 - Project Stage Gate Procedure.
8. EPM-EQ0-PR-000004 - Project Simplified Stage Gate Procedure.

5.0 RESPONSIBILITIES

The Project Manager has overall responsibility for the review package development and directs estimate revisions as needed after each estimate review. The Project Manager also ensures that the Entity review packages conforms to the Entity's requirements and referenced procedures in section 4.0.

The Project Estimator gathers data, prepares the review package, and ensures that the package accurately reflects the cost estimate. The Project Estimator is responsible for taking and administering the action item list from the reviews. Following the estimate review, the Project Estimator incorporates resolved action items from the review.

The level of involvement by the key project team will vary between the different classes of estimate review, in support of the estimate review and presentation process, key project team member's responsibilities include the following:

- The Engineering Manager or his representative reviews and presents all quantities and other technical information that have formed the estimate basis.
- The Construction Manager or representative reviews and presents the construction execution plan and strategy to verify that it is incorporated in the estimate.
- The Procurement Manager or representative reviews and presents the designed plant equipment and materials, delivery lead times and pricing.
- The Commissioning and Operations Manager or representative reviews and presents the commissioning and operations execution plan and strategy.

All departments are responsible for reviewing their respective staffing estimates and confirming that resources are properly reflected in the estimate to support project execution.

Depending on the extent of review, during the estimate review process, the Entity Manager of Estimating may review and approve the estimate presentation package. The respective Entity Manager of Estimating is responsible for the review and approval of all estimates.

6.0 PROCESS

A flow diagram of the estimate package and review process is included as **Attachment 1**.
Before the estimate kick-off meeting, a schedule is developed for estimate preparation and review, including the appropriate estimate review milestones. At the kick-off meeting, all parties review and agree to the schedule and issue it as a working tool. A typical internal estimate review package contains descriptions and summaries of the estimate's major elements. Depending on the type of review, an estimate review package should address the topics noted in **Attachment 2** and the following:

- Percent engineering completion
- Design allowances
- Manual labor basis, including productivity
- Indirects
- Entity office pricing
- Unit rate comparison
- Historical cost data comparison

To help assess the estimate's quality, the review package should address:

- Scope definition
- Quantity basis (material take-offs, estimated, factored, historical, allowances)
- Assumptions
- Pricing basis (firm, budgetary, estimated, historical, factored) of material, plant equipment and subcontracts
- Manual labor wage basis
- Entity staffing plans basis and assumptions
- Project Schedule Basis – typically at a summary level highlighting the key milestones.

If productivity or cost factors from historical projects are applied, the historical projects should be identified, and a brief scope discussion of the results of the comparison to the historical projects should be included. Pricing and quantity basis may be presented using pie charts.

If historical data is available, the estimate package should include historical project comparisons to the current estimate's bulk material quantities, labor productivity, field indirects/distributables, and permanent office hours. Using similar information from other projects, present a representative comparison for validating the current estimate data. To help explain the comparisons, historical parametric project data should be provided.

Attachment 3 outlines a detailed estimate review package. The basic estimate package format should be followed regardless of estimate class and scope. After basic requirements are met the level of detail in a review package will depend on the class of estimate and audience.

Times and dates should be set for the following reviews (some reviews may be combined with others). The objective is to ensure that all areas, as described below, are reviewed:

- Scope and Quantity Review
- Project/Proposal Team Review
- Entity Functional Management Review
- Entity Senior Management Review

Attachment 4 defines the roles during reviews.

For a services estimate, the estimate review package is a simplified version of the detailed estimate package.

Attachment 5 - EPM-KPE-TP-000010 - Estimate Open Items Template work as registry of all open issues have to be closed before the estimate exercise is concluded.

A detailed review package is not required for the working level scope and quantities review; however, bulk quantity and equipment information must be presented to facilitate this review. The estimate package is initially prepared for the project team review and for each subsequent review meeting. When comments are received that require follow-up action or an estimate revision, the Project Estimator is responsible for resolving the action item and/or revising the estimate. Revisions should be made as soon as possible after the review meeting. Once all action items and estimate changes are complete, the Project Estimator must present the action item resolutions and estimate changes to appropriate meeting attendees. At the end of each internal review meeting, review copies should be collected to maintain confidentiality of the proposed pricing.

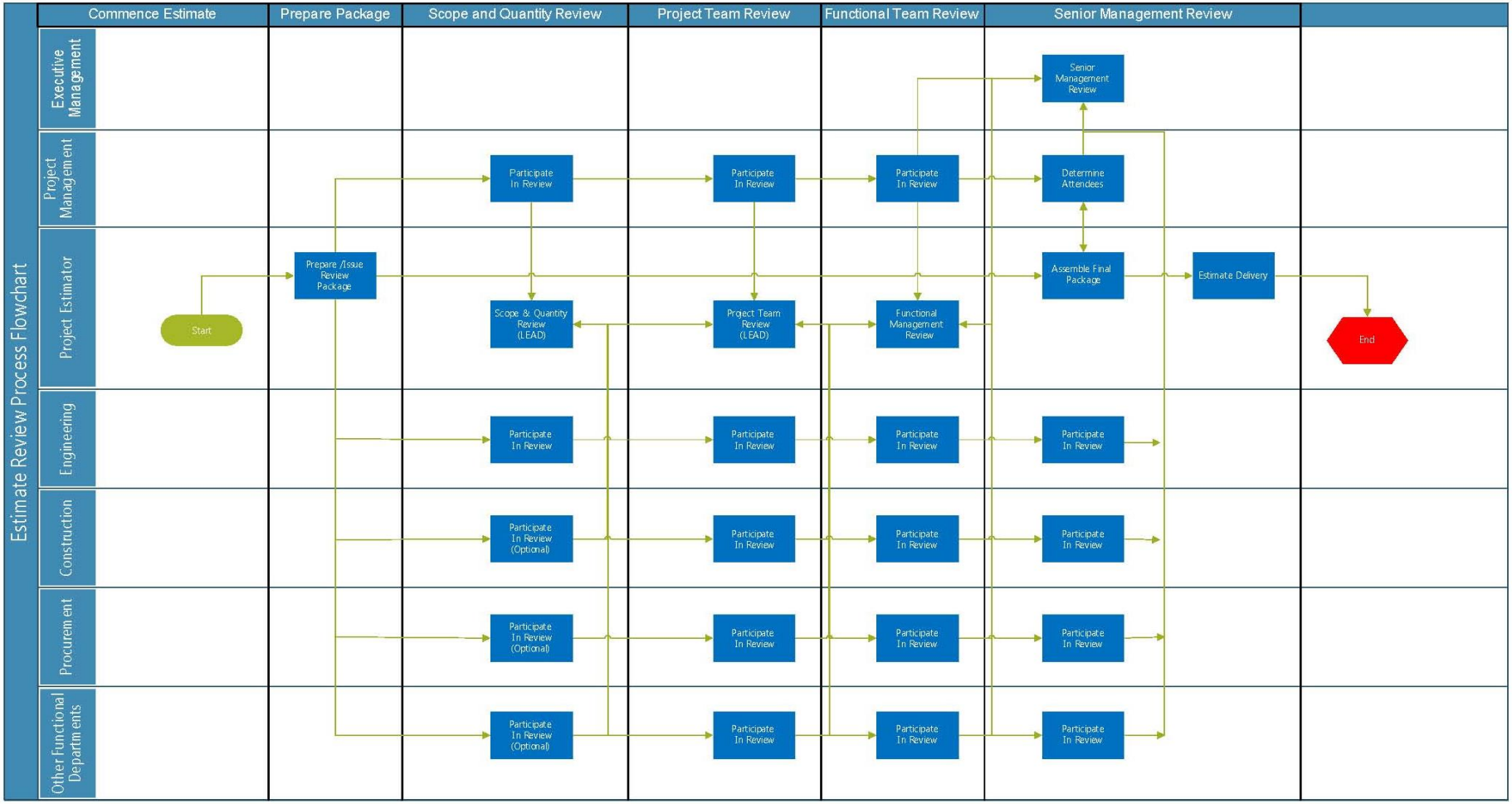
This process is continued through the Entity senior management review; for this review, the review package should be as concise as possible.

The format and content are usually specified in the Request for Proposal (RFP) or existing contractual requirements.

7.0 ATTACHMENTS

1. Estimate Review Package Process Flowchart
2. Contents by Type of Review
3. EPM-KPE-TP-000008 - Estimate Review Package Template
4. EPM-KPE-TP-000009 - Presentation Attendees, Roles and Agenda Template
5. EPM-KPE-TP-000010 - Estimate Open Items Template

Attachment 1 - Estimate Review Package Process Flowchart



Attachment 2 - Contents by Type of Review

	Scope and Quantity	Project Team	Functional Management	Senior Management
Executive summary		x	x	x
Project data	x	x	x	x
Estimate basis		x	x	x
Project Scope	x	x	x	
Quantity development	x	x	x	x
Pricing basis		x	x	x
Manual labor		x	x	x
Indirect costs		x	x	x
Professional services		x	x	x
Schedule basis		x	x	x
Escalation		x	x	x
Contingency/Risk		x	x	x
Qualifications and Exclusions		x	x	x
Late adjustments		x	x	x
Cost Estimate Reports				
Plant Equipment		x		
Bulk Materials		x		
Direct Manual Labor		x		
Subcontracts		x		
Construction Facilities		x		
Construction Support		x		
Professional Services (home, project, field)		x	x	
Escalation		x	x	x
Contingency		x	x	x
Project Cost Summary		x	x	x
Estimate details (dashboard)		x	x	

This will depend on the Class of Estimate

	Scope and Quantity	Project Team	Functional Management	Senior Management
General layout	x	x		
Scope of facilities	x	x		
Work breakdown structure	x	x		
Quantity basis	x	x		
Quantity comparisons	x	x		
Quantity summary	x	x		
Bulk material		x		
Plant equipment		x		
Unit rates (UR)		x		
UR comparisons				
Wage rates		x		

Attachment 3 - EPM-KPE-TP-000008 - Estimate Review Package Template

Sample Review Package

Estimate Review Package

Estimate

Estimate Class

for:

Expro No.: Project No.-Package

Entity.: ABC
[City Name], Province
No. DE-1234

Table of Contents

— Volume I —

1. EXECUTIVE SUMMARY

1.1 SCOPE

Estimate type:	Type and classification	
Entity:		
Technology:		
Location:		
Project Scope Summary:	Provide Engineering, Procurement, Construction and Testing & Commissioning and Handover and Training…… Additional scope details are contained in Section 3.2 of this package.	
Reference Facility:		
Major Equipment	**(Specify Type- example Electric Transformer):**	General description
	[Add or delete as appropriate]	
Options:	[As appropriate]	
Contractors:		
Contract:		
Milestones:	**Date**	**Duration**
Stage Gate:	Stage Gate X	
Execution:	Limited NTP	
	NTP	
	Target	
	Guarantee	

1.2 EXECUTION PLAN SUMMARY

[The Execution Plan Summary date and durations above should be shown in Section 3.4 Critical Path Analysis.]

2. ESTIMATE BASIS

2.1 GENERAL

[This estimate is a Class 3 estimate and should be considered a firm commitment by the Entity at this time. Firm pricing will be provided when the Contractors have been selected for

this project and a detailed scope book is prepared supporting a LSTK (lump sum turnkey) firm scope of work, estimate, and performance.]

This estimate is based on ……in accordance with current standards and accepted industry design practices.

Standard industry practices for design, safety and operation inside the plant boundary are assumed.

Project Scope Pricing basis is May 1, 2017.

2.2 PROJECT SCOPE DETAILS

[A more complete description of the project scope may be inserted here.]

2.3 DESIGN BASIS

The model has been adjusted based on environmental and site requirements specified in the Scope of work. Deviations from the reference plant were required to comply with these conditions and to provide the most competitive offering. Examples of the most significant deviations include:

2.4 EXECUTION STRATEGY

General	1. …… 2. The delivery model will follow a typical [LSTK – Lump Sum Turnkey] [EPC-Engineering, Procurement, and construction] [EPCM – Engineering. Procurement, and Construction Management] contract. 3. …….. and is responsible for project management, Entity / Contractor interface, …...]
Engineering	1. This project will be executed by …. 2.
Procurement	1. Procurement will utilize [Global Supply Network] [Local Procurement] to the greatest degree possible.
Construction	1. Construction will be executed by [Contractor] [Subcontract and C/M – Construction Management]. 2. Work week is 5-8's, 4-10's,etc. 3. Second shift for critical path activities, including [boiler weld-out, cable pulling, steel shakeout, …….]
Management	1. A PM-Project Manager is included for [__] months 2. An APM-Assistant PM is included for [___] months, [and is responsible for Prime Contracts management] 3. Secretarial support is included with Admin. 4. A [Project Controls Manager] is included for [__] Months 5. Schedule and trend responsibilities will transfer to the field at month [__].

2.5 DIRECT COSTS

2.5.1 Major Equipment Pricing

Procurement has reviewed the applicable quotations and database pricing and determined competitive pricing levels for this equipment.

Equipment	Vendor	Pricing Basis	Evaluated Price	Notes
Specify type				
	Estimate Price			
Specify type				
	Estimate Price			
Specify type				
	Estimate Price			
	Estimate Price			
	Estimate Price			
	Estimate Price			
	Estimate Price			
	Estimate Price			
	Estimate Price			

Notes:

1-[Use note to discuss scope or to describe adjustments made in price
This includes freight, etc. Vendor reps should be specifically addressed]

2.5.2 Direct Material Pricing

Material pricing in the estimate has been obtained from the following sources:

	Civil %	Mechanical %	Electrical %	Fire %	Total %
1. Firm quote					
2. Multi-project agreement					
3. Budget quote					
4. Database					
5. Phone quote					
6. Price guides					
7. Estimated					
8. Other					
Total	100	100	100	100	100

[This table can be modified depending on the specifics of the project.
Typically,the commodities with the most cost should deserve more granularity]

2.5.3 Quantities

Quantities were developed using……as a base and adjusting for site specifics, environmental requirements, and configuration changes. (Refer to items 5 and 6)

All quantity input has been reviewed by estimating for reasonableness.

Discipline	Commodity	Developed by
Civil		
Mechanical		
Electrical		
Fire		

2.5.4 Jobhour Estimates

This will be calculated by the Contractor

2.6 DISTRIBUTABLE COST AND INDIRECT COST

This will be calculated by the Contractor

2.7 ENGINEERING AND OTHER ENTITY OFFICE COST

A staffing plan has been prepared for all the Entity Office positions.
Budgets have been reviewed and approved by the chief engineers.
Other Entity office hours have been estimated based on input from the departments.
All Entity services hours have been priced using current wage and benefit information.

2.7.1 Travel

The estimate includes the following trips:

Riyadh to Site	
Site to Riyadh	

2.7.2 Travel costs have been furnished by ……

2.8 OTHER COSTS

Permits	• Construction permits are included. Other permits are excluded.
Taxes, duties	• By the Contractor
Bonds	• A 10% payment bond is included in lieu of retention. • Rates were furnished by the Controller.

	• [discuss any other bonds or LOCs]
Insurance	• Rates for insurance and LD insurance were obtained from the Risk Manager.
Contingency	• Contingency has been calculated based on the contingency analysis
Escalation	• Escalation on bulk material is calculated to the centroid of the work. • Escalation on equipment is calculated to the first delivery. • Escalation on bulks is calculated to the centroid of the work. • Escalation on labor is calculated to the centroid of the work. • Escalation rates on material are [xx%] in …, and [xx%] in …. through 2018. Other rates are shown on the worksheet.

3. SCHEDULE BASIS

The schedule has a XX-month target completion and a XX-month guaranteed completion from NTP – Notice to Proceed. There is a XX-month LNTP – Limited Notice to Proceed period prior to NTP.

3.1 KEY DATES

KEY DATES	Months from NTP

3.2 KEY ASSUMPTIONS

Dates shown on the base Milestone Summary Schedule are in accordance with XXXX

Site access will be granted for Geotechnical and Site Survey work to begin at LNTP XXXX

Equipment XXX will arrive at site in month XX from NTP

3.3 RISKS AND MITIGATION

Risk	Mitigation

3.4 CRITICAL PATH ANALYSIS

3.4.1 PRIMARY CRITICAL PATH

Text to be completed according to on project analysis.

3.4.2 SECONDARY CRITICAL PATH

Text to be completed according to on project analysis.

3.5 SCHEDULE QUALIFICATIONS AND ASSUMPTIONS

Text to be completed according to on project analysis.

[Suggest distributing this as a handout]

4. QUALIFICATIONS AND ASSUMPTIONS

4.1 COMMERCIAL

The cashflow has been developed to be cost-of-capital [positive][neutral]. [An initial down payment of ___% will be made at NTP. Future invoices will be submitted on the first of the month, with payment within 30 days.]

Entity will provide a [10%] advanced payment. Contractor will provide a 10% advanced payment bond, which shall expire as the advance is worked off.

Performance bond [3%] will be provided by Contractor and will expire 30 days after commercial operation.

All payments made to Contractor by the Entity will be in SAR currency. The price is stated in Saudi Arabian Riyals. Workers Compensation, Builder's Risk, Automobile Liability Insurance and General Liability Insurance shall be provided by the Contractor.

4.2 EXCLUSIONS (BY ENTITY/OTHERS)

All work outside the site boundary

4.3 EVALUATED RISKS

A listing of items identified during the estimating process which are considered risk issues should be included in this section. Identified mitigating actions (i.e. "included in contingency analysis", "allowance included in estimate", "suggest contract language to mitigate", etc.) should be noted for each risk issue.

4.4 Engineering

The plant will be designed and constructed to the following codes and standards (Please refer to the scope book for a complete list of codes and standards):

Building	
Concrete	
Steel	
Boiler	
Fire	
Electrical equipment	
Electrical	

4.4.1 Civil

The site is assumed to be level and near finish grade.

Rock excavation is not required.

The site is assumed to be a "greenfield"; the site is free of underground obstructions or utilities.

Removal and disposal of hazardous waste (except that generated by construction activities) is included.

The site is accessible for heavy hauls.

Subsurface investigation [has][has not] been completed. Soil bearing capacity is [assumed to be] a minimum of kN/m2, therefore no piling is required. Foundations are based on spread footings. [We will not assume any subsurface risk until geotechnical investigation is complete.]

Suitable soil material for backfill is available onsite. Spoils may be disposed of on site; hauling is excluded.

Wetland mitigation is excluded. Endangered species protection is not required.

Infrastructure improvements such as roads, bridges, or other work are excluded.

Demolition, relocation or refurbishment of existing structures is excluded.

Temporary construction housing / camp is included as required by Contractor.

Permanent housing colony is included as required.

4.4.2 Mechanical

No system/equipment redundancy is included.

Noise levels are less than [90] dba at 1 meter (from any piece of plant equipment).

Performance guarantee is based on a single fuel at a pre-agreed operation point.

Pipe sizing is based on the allowable pressure drops from the heat balances and the pipe velocity limitations as identified in the Mechanical Design Standards and Guides used by the Entity.

Equipment sizing and use of design margins is based on the recommendations identified in the Mechanical Design Standards and Guides.

Fire detection and suppression systems will be provided in accordance with NFPA- National Fire Protection Association requirements and recommendations.

Large outdoor storage tanks will be uninsulated

Except for the HVAC- Heating Ventilation and Air-Conditioning systems serving the control room, administration areas, and other normally occupied areas, the systems will not be designed to provide comfort levels for extended human occupancy.

4.4.3 Electrical

Unless noted otherwise, the electrical equipment will be per IEC-International El International Electro-technical Commission and other SEC- Saudi Electrical Company standards.
The plant equipment design is based on Utility system voltage variation not to exceed +/- 5% and frequency variation not to exceed 0.5%.

Cathodic protection for underground piping will be added on scope change, if the soil resistivity is less than 200 ohm meters (to be verified during detailed design phase).

Heat tracing is included for caustic lines only.

4.4.4 Control Systems

The system included covers the building management system, the HVAC control system, any road signaling systems.

4.5 Procurement

Vendor inspection will be performed by Contractor. Any third party inspection required by Contractor.

Vendor selection and approval is by Entity / Contractor.

4.6 Constructions

Temporary construction power is available at the plant boundary via a [13.8] kV (minimum) line.

One paved access road outside the plant boundary to the nearest paved public road has been estimated.

Construction will use adjacent space on the plant site for laydown.

4.7 Schedule

The estimated cost is based on the Milestone Summary Schedule (MSS) attached.

Guaranteed completion will be achieved and schedule liabilities will cease upon handover and closeout.

The schedule assumes the following durations for each of the stage gates from commencement of registration

- Stage Gate 1 – Registration XXXX weeks
- Stage Gate 2 - Initial Planning XXXX weeks
- Stage Gate 3 - Tender for Design XXXX weeks
- Stage Gate 4 - Design XXXX months
- Stage Gate 5 - Tender for Construction XXXX weeks
- Stage Gate 6 - Construction XXXX months
- Stage Gate 7 - Testing & Commissioning XXXX weeks
- Stage Gate 8 – Handover and Closeout XXXX weeks

A maximum of [30] days is included for document approvals and for clearing customs

5. RECONCILIATION

The reconciliation is developed at the end of the cost estimating cycle, and is included as part of the estimate presentation package. This reconciliation aligns the previous estimate scope with the current estimate scope, and it identifies the scope and cost differences, along with an explanation as to why there is a difference.

5.1 Examples:

- Plot Area has increased
- Building footprint has decreased, height has increased, i.e. number of floors increased.
- Piping average bore has decreased, quantity of piping has increased.
- Etc.

6. BENCHMARKING

The benchmarking is developed during the cost estimating cycle, and is included as part of the estimate presentation package. This reconciliation aligns the proposed estimate and facility scope with a selected reference plant, and it identifies the scope and cost differences. This analysis helps to determine the accuracy of the estimate for the proposed facility

7. LATE CHANGES

Late changes are the capture of costs that are included at the last minute or which have not been fully defined. These are required to be listed

8. MINIMUM REQUIREMENTS LISTING

This will be a table which compares the estimate that is being reviewed with the classification type to ensure the current estimate meets the minimum classification requirements for this stage gate. The level of detail will vary depending on the classification of the estimate, see table below.

Minimum Requirement Listing Comparison for : XXXXXXXXXXXXXXXXX

	Class 5	Estimate Compaparison
Expected Accuracy Range	L: -20% to -50%	-X% to XX%
	H: +30% to +100%	
Estimate Description	Indicative / Conceptual	XXXXXXXXXX
Typical Use	Project screening and viability, market studies, evaluation of alternate schemes	Usage of Estimate
Typical Engineering % Complete	0% to 2%	XXX%
Level of Definition	Geographic location / Country - Regional specific / General Site Conditions	Compare the level of defintion used
	Gross dimensions	
	Preliminary Block Flow Diagrams, process description/expected plant capacity/configuration (including Outside Battery Limits (OSBL))	
	Gross dimensions	
Typical Estimating Methodology / Approach	Using the actual cost of a previous, similar project as a basis for estimating the cost of the current project. Use of percentage factors and expert judgment.	Methodology / Approach used
Typical Basis of Unit Costs	Estimated costs typically based on historical information (that may be adjusted using indices), factored from other costs, etc.	Basis of the cost Estimate
		Calculated Contingency Level
Typical Contingency Level	>30%	X%

Attachment 4 - EPM-KPE-TP-000009 - Presentation Attendees, Roles and Agenda Template

Attendees	Scope and Quantity Review	Project Review	Functional Management Review	Senior Management Review
Project				
Project Manager	Leader	Leader/Approve	Leader	Leader/Presenter
Project Engineer	Concur	Concur	Concur	Concur
Project Estimator	Presenter	Presenter	Presenter	Support
Project Construction Rep.	Concur	Concur		
Project Procurement Rep.	Concur	Concur		Other attendees defined at the Functional Review
Studies Department Rep.		Concur		
Project Contracts Rep.		Concur		
Entity Line Management				
Operations Manager			Approve	
Engineering Director			Concur	
Cost Department Manager			Concur	
Estimating Manager			Concur	Concur
Construction Manager			Concur	
Entity Senior Management				
Entity President				Approve
Operations			Concur	Concur
Controller			Concur	
Project Controls Director			Concur	Concur
Studies Dept. Director			Concur	Concur
Contracts Director			Concur	Concur
Legal Counsel			Concur	Concur

AGENDA

Item	By	Time
1. Executive Summary	Project Manager	10 minutes
2. Open Items	Estimator	5 minutes
3. Execution Philosophy	Estimator, Team	…etc.
4. Design Basis	Engineering Manager	
5. Quantities	Engineering Manager, Estimator	
6. Major Equipment Pricing	Estimator, Procurement Manager	
7. Direct Materials Pricing	Estimator, Procurement Manager	
8. Jobhour Estimates	Estimator, Construction Manager	
9. Other Cost Information	Estimator	
10. Schedule	Estimator	
11. Estimate Summaries	Estimator	
12. Action Items Review	Estimator	

Attachment 5 - EPM-KPE-TP-000010 - Estimate Open Items Template

No.	Description / Resolution	Responsibility	Due Date
1	[Add open items as they are identified		
2	Assign responsibility and due date		
3	Upon completion, note the resolution, and shade the item to signify closure]		
4			
5			
6			
7			
8			