

ENGINEERING PLAYBOOK – WIND POWER PROJECT

Comprehensive Engineering Guide for Wind Project Execution



Part 3/6 | Playbook Series for Project Nav Saksham
Developed for Torrent Power

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Abstract

This playbook serves as a comprehensive guide to the engineering phase of wind projects at Torrent Power. Its primary objective is to standardize, streamline, and optimize the engineering process, ensuring seamless execution as the organization scales up its RE portfolio.

The playbook provides a structured framework for each stage of the engineering process—from developing the basic engineering design during bid submission to creating detailed engineering designs post-project award and addressing engineering-related challenges during execution.

Each chapter outlines clear process steps, process maps, RACI matrices, and KPIs to enhance operational efficiency, ensuring consistency across projects.

By implementing standardized operating procedures (SOPs) and integrating industry best practices, this playbook will enable Torrent Power to scale wind projects efficiently while maintaining high standards of quality, compliance, and performance.

Objectives

- **Establish a Standardized Approach** – Provide a unified, repeatable methodology for engineering function, ensuring consistency across all wind projects
- **Streamline Engineering Processes** – Optimize key stages through well-defined steps and roles, enabling efficient project execution
- **Monitor and Improve Performance** – Track and analyze progress using KPIs and RACI matrices, identifying bottlenecks and enhancing accountability
- **Support Scalable Growth** – Facilitate Torrent Power's expansion in wind energy by developing a robust engineering framework that adapts to increasing project complexity
- **Enhance Collaboration** – Foster seamless communication and decision-making by clearly defining processes, roles, and stakeholder expectations

Scope

This playbook outlines structured approach to engineering function for wind projects at Torrent Power. The scope includes:

- **Process Steps** – Detailed guidelines for each phase of the engineering process, from developing the basic engineering design during bid submission to creating detailed engineering designs post-project award and addressing engineering-related challenges during execution. This ensures that all engineering activities are consistent, systematic, and aligned with the overall project goals
- **Process Maps** – Visual representations of the key workflows and steps involved in the engineering stages. These maps help to clarify the sequence of activities, decision points, and dependencies, facilitating seamless understanding of cross-team collaboration

- **KPIs** – Clearly defined metrics for tracking team performance throughout the engineering stages. These KPIs facilitate efficient monitoring and help identify potential bottlenecks, ensuring timely intervention to optimize project flow.
- **RACI** – Clear RACI matrices that define roles and responsibilities for each step of engineering process. This ensures accountability and transparency, clarifying who is responsible for each task and who needs to be consulted or informed at each step.

This playbook serves as the foundation for establishing consistent and efficient practices, supporting the successful execution of future wind projects at Torrent Power.

Coverage

Chapter 1 – Basic Engineering Design Preparation

Outlines the process for developing the Basic Engineering Design, Guaranteed Technical Particulars (GTP), and preliminary Bill of Quantities (BoQ) and Bill of Services (BoS) to ensure technically feasible bid submissions

Chapter 2.1 – Owner’s Engineer Finalization

Elaborates on a structured approach for determining Owner’s Engineer (OE) requirements and coordinating the process of hiring OE for the project to ensure effective engineering designs validation for the project

Chapter 2.2 – Preliminary Works Execution

Defines the systematic process for initiating and overseeing preliminary works, defining requirements, procuring Site Survey Consultants, and ensuring timely deliverable submission to support Detailed Engineering Design preparation.

Chapter 3 – Detailed Engineering Design Preparation

Outlines the process of preparing Detailed Engineering Design by defining expected deliverables, assigning responsibilities, and facilitating coordination between EPC Contractor, Project Engineering Managers (PEMs), and Lead PEM to meet project timelines.

Chapter 4 – Sign-Off for Detailed Engineering Design

Outlines the structured and collaborative verification process for Detailed Engineering Designs, BoQ, and BoS by facilitating alignment between Project Engineering Managers (EMs) and Owner’s Engineer (OE), resolving disagreements, and securing final approvals

Chapter 5 – Issue Resolution for Detailed Engineering Design

Establish a systematic approach for assessing and resolving engineering challenges encountered during project execution, ensuring minimal disruption to overall project schedule

Chapter 6 – Owner’s Engineer and External Consultants Management

Outlines the process for evaluating and empaneling new vendors based on the Annual Growth Outlook, ensuring adequate vendor availability in target regions

Who is this playbook for?

- **Engineering Team** – Team directly responsible for the engineering functions. The playbook provides a structured approach across processes, enhancing process consistency, efficiency, and clarity
- **Cross-Functional Teams** – Departments involved in the engineering process, such as BD team, project team, procurement team etc. The playbook helps align each team's contributions, clarifies roles and responsibilities through RACI, and ensures seamless coordination during the engineering stages

Chapter 1 – Basic Engineering Design Preparation

1.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Bid Incharge ¹ shares Bid Summary ² with Wind Engineering Head (WEH) and requests them to develop Basic Engineering Design, which is to be included in the bid submission					-
P1	– WEH assigns the Engineering Manager (EM) to develop Basic Engineering Design. WEH shares the Bid Summary with the EM					-
P2	– EM analyzes the Bid Summary to define the basic engineering design requirements based on – – shortlisted land parcel specifications, – target wind energy output, and – feasibility of grid interconnection	I1	Bid Summary	O1	Basic Engineering Design Requirement (Template Provided)	0.5
P3	– EM develops the bid-specific Basic Engineering Design based on the requirements defined in P2 and leverage the Basic Engineering Design Library	I2	Basic Engineering Design Library ³	O2	Basic Engineering Design	0.5
		I3	Basic Engineering Design Requirement			
P4	– EM defines the Guaranteed Technical Particulars ⁴ (GTP) based on the Basic Engineering Design for the project	I4	Basic Engineering Design	O3	Guaranteed Technical Particulars (GTP)	0.5
P5	– EM develops preliminary Bill of Quantities (BoQ) and Bill of Services (BoS), leveraging GTP and Basic Engineering Design for the project	I5	Basic Engineering Design	O4	Preliminary BoQ	0.5
		I6	GTP	O5	Preliminary BoS	
KEY - S: Start P: Process Steps I: Input O: Output E: End ●: Detailed in cross-functional playbooks						

¹ Bid incharge is responsible for overseeing end to end bid submission.

² Bid Summary is to be created by bidding team, and it should capture all relevant details from the tender document. Bid summary to aid the functional departments to create their respective plans and outputs, required during bid submission

³ Basic Engineering Design Library is a centralized archive of all basic engineering designs submitted for past bid submissions. It serves as a ready-to-use resource for preparing and submitting future bids efficiently

⁴ GTP defines the required technical specifications and performance parameters for the materials and services to be procured

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P6	<ul style="list-style-type: none"> EM seeks review and approval from WEH on the following outputs – Basic Engineering Design GTP Preliminary BoQ and BoS 					0.5
P7	<ul style="list-style-type: none"> WEH reviews the outputs (Basic Engineering Design, GTP and Preliminary BoQ and BoS) – If modifications are required, WEH recommends changes If modifications are not required, WEH grants approval 	I7	Basic Engineering Design	O6	Basic Engineering Modifications (Template Provided)	0.5
		I8	GTP			
		I9	Preliminary BoQ			
		I10	Preliminary BoS			
P8	<ul style="list-style-type: none"> If WEH recommends any modifications to the outputs shared, EM incorporates those and reshapes the outputs for approval 	I11	Basic Engineering Modifications			0.5
P9	<ul style="list-style-type: none"> WEH seeks further review and approval from MD on the outputs (<i>Basic Engineering Design, GTP and Preliminary BoQ and BoS</i>) 					0.5
P10	<ul style="list-style-type: none"> If MD recommends any modifications, WEH notifies the same to EM, who incorporates those and shares the finalized outputs with WEH 					
P11	<ul style="list-style-type: none"> WEH shares the Basic Engineering Design, GTP, Preliminary BoQ, and BoS with Bid Incharge for bid submission WEH shares the preliminary BoQ and BoS with the Procurement Lead for procurement cost estimation, for the commercial bid 					-
E	<ul style="list-style-type: none"> WEH adds the finalized Basic Engineering Design Document to the Basic Engineering Design library for future reference 					Total – 4 – 5 weeks

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

1.2 RACI

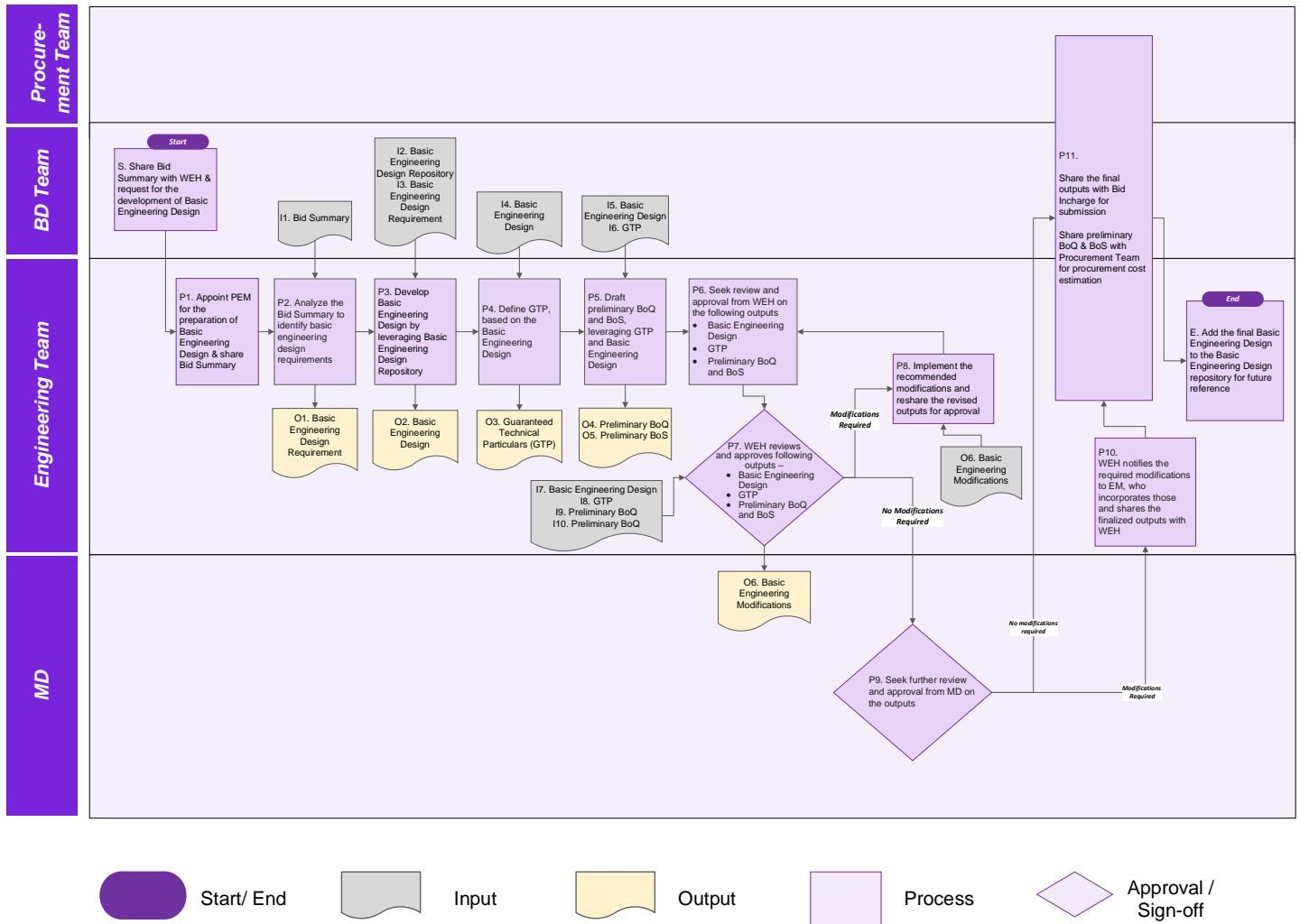
#	Key Task	Responsible	Accountable	Consulted	Informed
S	Share Bid Summary with Wind Engineering Head (WEH) & request for the development of Basic Engineering Design	Bid Incharge	Bid Incharge		WEH
P1	Appoint Engineering Manager (EM) for the preparation of Basic Engineering Design & share Bid Summary	WEH	WEH		EM
P2	Analyze Bid Summary to define basic engineering design requirements	EM	EM		
P3	Develop Basic Engineering Design by leveraging Basic Engineering Design Library	EM	EM		WEH
P4	Define Guaranteed Technical Particulars (GTP)	EM			WEH
P5	Draft preliminary Bill of Quantities (BoQ) & Bill of Services (BoS)	EM			WEH
P6	Submit the prepared outputs (<i>Basic Engineering Design, GTP and Preliminary BoQ and BoS</i>) to WEH for review and approval	EM	EM		WEH
P7	Review the outputs received and recommend modifications or approve	WEH	WEH		EM
P8	Implement the recommended modifications and reshare the revised outputs for approval	EM	EM		WEH
P9	Seek further review and approval from MD on the outputs	WEH	WEH	MD	MD
P10	If MD recommends any modifications, notify the required changes to EM	WEH	WEH		EM
	Incorporate the changes recommended by MD and share the finalized outputs with WEH	EM	EM		WEH

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

#	Key Task	Responsible	Accountable	Consulted	Informed
P11	Share the final outputs with Bid Incharge for submission	WEH	WEH	Bid Incharge	
	Share preliminary BoQ & BoS with Procurement Lead for procurement cost estimation	WEH	WEH	Procurement Lead	
E	Archive final design documents in Engineering Library	WEH	WEH		

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

1.3 Process Map



1.4 Templates for Input/ Output

1. Basic Engineering Design Requirement

S. No.	Drawing / Document Title	Description / Scope	Prepared By	Reference from Past Bids
1	Wind Turbine Foundation GA Drawing	General arrangement showing typical turbine foundation layout, dimensions, and sections	Civil/Structural Engineer	Bid ABC, dated 03-Feb-2024
2	Single Line Diagram (SLD) – Power Evacuation	Electrical SLD from turbine switchgear to pooling substation and grid interconnection	Electrical Engineer	Bid PQR, dated 22-Jul-2023

2. Basic Engineering Modifications

S. No.	Drawing / Document Title	Modification Required	Reason for Change
1	SLD – Power Evacuation	Add isolation switch between turbine feeder and main bus	Grid compliance and operational flexibility
2			
3			
4			

¹ **Map Glossary** – BP: Bid Planner | PFR: Preliminary Feasibility Report

Chapter 2.1 – Owner’s Engineer Finalization

2.1.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	<ul style="list-style-type: none"> Chief Business Development notifies the Wind Engineering Head (WEH) about bids won 					-
P1	<ul style="list-style-type: none"> WEH appoints Project Engineering Manager(s) (PEMs) for the project WEH may appoint separate PEMs for civil, electrical, and plant design engineering 					-
P2	<ul style="list-style-type: none"> WEH designates a Lead PEM to facilitate cross-functional coordination and external communication If multiple PEMs are appointed, one is designated as the Lead PEM If only one PEM is appointed, they automatically assume the role of Lead PEM 					-
P3	<ul style="list-style-type: none"> Lead PEM drafts the Owner’s Engineer (OE) Requirements List, leveraging – <u>Basic Engineering Design to determine:</u> <ul style="list-style-type: none"> Capability Requirements: Expertise, qualifications, and software skills required Staffing Requirements: Number of engineers required <u>Final L1 Plan to identify:</u> <ul style="list-style-type: none"> Engagement Duration: Estimated duration for which OE is required Design Verification Turnaround: Expected turnaround for design verification, aligned with the project schedule 	I1	Basic Engineering Design	O1	OE Requirement List (draft)	0.5
		I2	Final L1 Plan			
P4	<ul style="list-style-type: none"> Lead PEM conducts a joint discussion with other PEM(s) to review the OE Requirement List, to ensure completeness and address any specific needs Lead PEM amends the OE Requirement List, if required 	I3	OE Requirement List (draft)	O2	OE Requirement List (final) (Template Provided)	0.5
KEY - S: Start P: Process Steps I: Input O: Output E: End ●: Detailed in cross-functional playbooks						

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P5	– Lead PEM shares the OE Requirement List with the Procurement Lead to initiate the RFQ process and obtain technical details from empaneled OEs					-
P6	– Procurement Lead conducts the RFQ process, and shares the responses with Lead PEM for technical evaluation	I4	OE Requirement List <i>(final)</i>	O3	RFP Responses for OE	•
P7	– Lead PEM conducts technical evaluation of the responses and shortlists OEs – For specific requirements incorporated in P4, Lead PEM conducts a joint discussion with other PEMs for evaluation	I5	RFP Responses for OE	O4	Shortlist of OEs <i>(Template Provided)</i>	1 <i>(for up to 5 OE responses)</i>
P8	– Lead PEM shares the Shortlist of OEs with the Procurement Lead					-
P9	– Procurement Lead assesses the shortlisted responses based on appropriate evaluation criteria and hires OE	I6	Shortlist of OE			•
P10	– Procurement Lead notifies <i>(via email)</i> Lead PEM of the hired OE					-
P11	– Lead PEM communicates <i>(via email)</i> the appointment of OE to other PEM(s) and WEH					-
E	– Lead PEM conducts a kick-off discussion with OE to explain detailed project requirements, scope, and deliverables timeline <i>(as detailed in OE Requirement List (final))</i> <i>Other PEM(s) shall also be invited to the kick-off discussion</i>					Total – 1.5 – 2 weeks

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

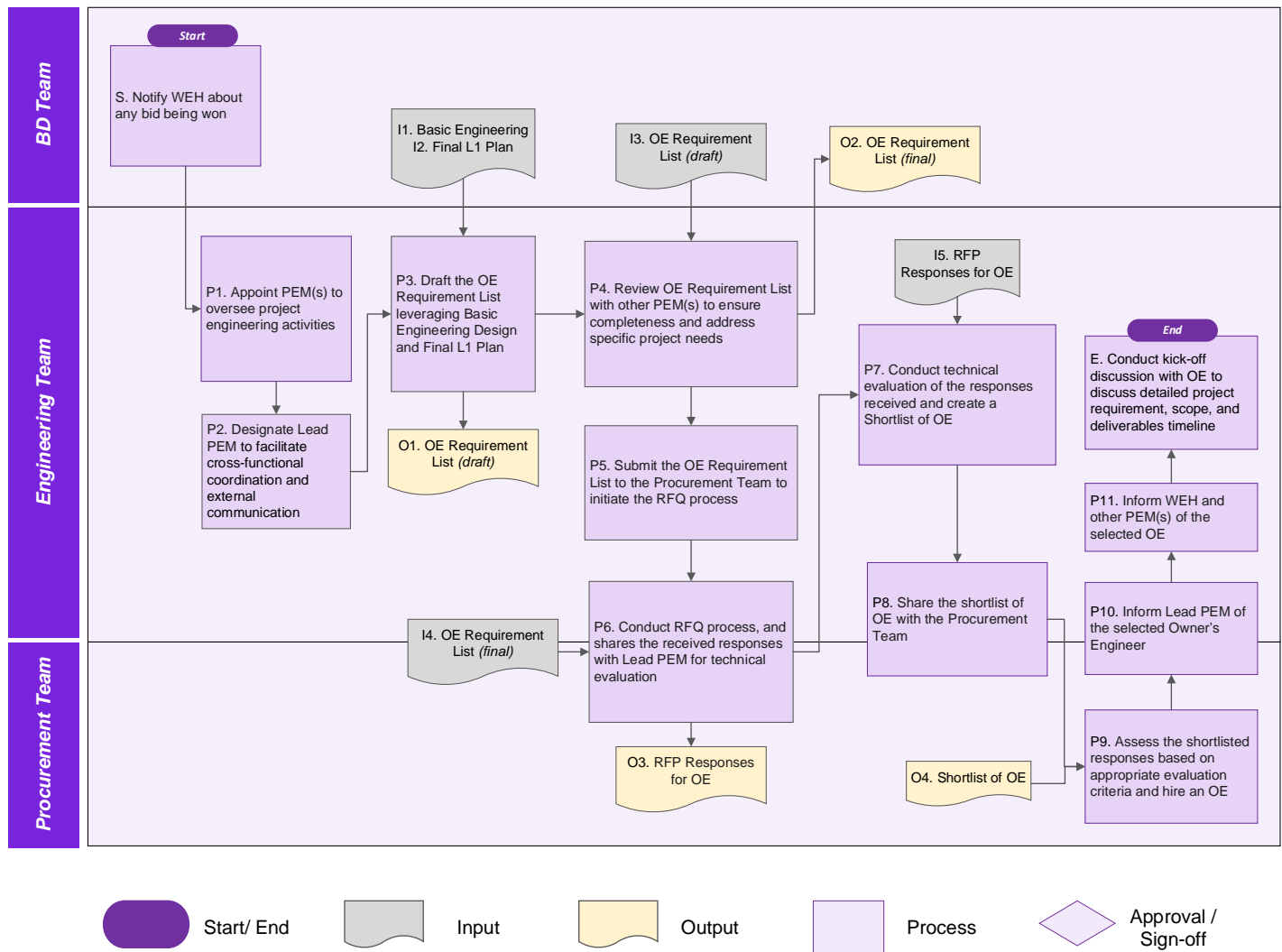
2.1.1.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Notify the Wind Engineering Head when a bid is won	BD Team	BD Team		WEH
P1	Appoint Project Engineering Manager(s) to oversee project engineering activities.	WEH	WEH		PEM(s)
P2	Designate a Lead PEM for cross-functional coordination and external communication	WEH	WEH		Lead PEM
P3	Draft the Owner's Engineer Requirement List leveraging Basic Engineering Design and Final L1 Plan	Lead PEM	Lead PEM		WEH
P4	Review the Owner's Engineer Requirement List with other Project Engineering Manager(s) to ensure completeness and address specific project needs	Lead PEM	Lead PEM	Other PEM(s)	
P5	Submit the Owner's Engineer Requirement List to the Procurement Lead to initiate the RFQ process and obtain technical details from empaneled Owner's Engineer	Lead PEM	WEH		Procurement Lead
P6	Conduct the RFQ process and shares received responses with the Lead PEM for technical evaluation	Procurement Lead	Procurement Lead		Lead PEM
P7	Conducts technical evaluation of the responses received and create a Shortlist of Owner's Engineers	Lead PEM	Lead PEM	Other PEMs	WEH
P8	Share the shortlist of Owner's Engineers with the Procurement Lead	Lead PEM			Procurement Lead
P9	Assess the shortlisted responses based on appropriate evaluation criteria and hire an OE	Procurement Lead	Procurement Lead		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

#	Key Task	Responsible	Accountable	Consulted	Informed
P10	Notify Lead PEM of the selected Owner's Engineer	Procurement Lead			Lead PEM
P11	Inform Wind Engineering Head and other PEM(s) of the selected Owner's Engineer	Lead PEM			WEH Other PEM(s)
E	Conduct kick-off meeting with OE to align on scope, timelines, and deliverables	Lead PEM	Lead PEM	Other PEMs	WEH

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

2.1.3 Process Map



2.1.4 Templates for Input/ Output

1. Owner's Engineer Requirement List

S. No.	Discipline / Area	Capability Requirements (Expertise, Certifications, Software)	Staffing Requirements (No. of Engineers / Roles)	Engagement Duration (Start–End / Months)	Design Verification Turnaround (Per Submission)	Comments / Notes
1	Civil – Turbine Foundation Design	Experience with STAAD Pro, IS 456 / IS 4091, IEC 61400-6; foundation fatigue design exposure	1 Sr. Civil Engineer 1 Civil CAD Technician	Aug 2025 – Jan 2026	5 working days	Foundation type depends on soil profile and turbine loads
2	Electrical – SLD & Cabling					
3	Plant Layout / Drainage					
4	Structural Design Review					
5	QA/QC Engineering Review					

2. Shortlist of OE

OE Name	PQC Compliance	Technical Competency	Previous Project Engagements	Compliance with OE Requirements	Shortlisted/ Rejected	Reason

Chapter 2.2A – Site Survey Consultant Finalization

2.2A.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	<ul style="list-style-type: none"> Project Manager notifies Wind Engineering Head (WEH) about the finalized Land Parcels for the project, and shares Land Demarcation Summary¹ for conducting Preliminary Works <p><i>The process shall commence only after finalization of the land parcel. Land Manager is responsible for notifying the Project Manager upon land finalization (detailed chapters in Pre-Development playbook chapter 4.3)</i></p>					-
P1	<ul style="list-style-type: none"> WEH shares the Land Demarcation Summary with Lead PEM and directs them to commence preliminary works 					-
P2	<ul style="list-style-type: none"> Lead PEM prepares the Preliminary Works Requirement Document, which specifies – <ul style="list-style-type: none"> List of tests/surveys² to be conducted Number of blocks for testing Standard block size as defined in Basic Engineering Design other pertinent technical requirements (e.g., software), and deliverable timeline, as aligned in Engineering Execution Plan³ 	I1	Land Demarcation Summary	O1	Preliminary Works Requirement Document (Template Provided)	0.5
P3	<ul style="list-style-type: none"> Lead PEM shares the Preliminary Works Requirement Document with the Procurement Lead, requesting them to initiate the RFQ process and obtain technical details from empaneled Site Survey Consultants (SSC) 					-

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | ●: Detailed in cross-functional playbooks

¹ The *Land Demarcation Summary* is a key document prepared during the physical demarcation of the identified land parcel. It captures essential details such as geographical coordinates, total area, site address, and other relevant land-specific information. The format and required data fields for this document are outlined in Chapter 4.2 – Land Demarcation & Handover of the Pre-Development Playbook.

² List of tests/surveys includes Geotechnical & Topographical Survey, Pile load Testing etc.

³ Engineering Execution Plan, detailed in Chapter 1.4 of the Planning Playbook, is a comprehensive document prepared by the Engineering Team, outlining all engineering deliverables and their corresponding project timelines

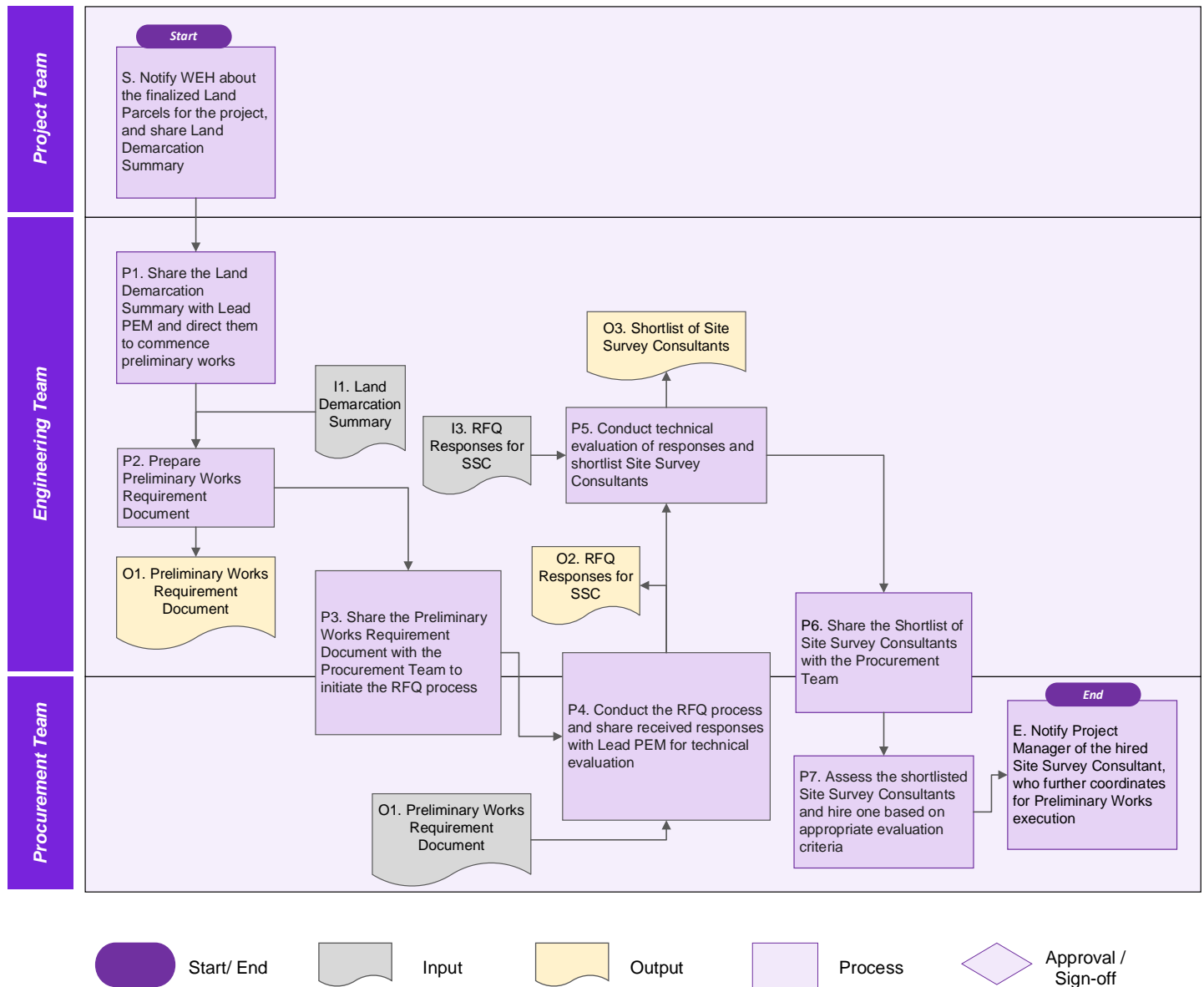
#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P4	– Procurement Lead conducts the RFQ process, and shares the vendor responses with Lead PEM for technical evaluation	I2	Preliminary Works Requirement Document	O2	RFQ Responses for SSC	•
P5	– Lead PEM conducts technical evaluation of the responses and creates a Shortlist of SSC	I3	RFQ Responses for SSC	O3	Shortlist of SSC	0.5
P6	– Lead PEM shares the SSC Shortlist with the Procurement Lead					-
P7	– Procurement Lead assesses the shortlisted SSC and hires one based on appropriate evaluation criteria					•
E	– Procurement Lead informs Project Manager of the hired SSC, who further coordinates with SSC for Preliminary Works execution					Total – 1 – 1.5 weeks

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

2.2A.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Notify Wind Engineering Head about the finalized Land Parcels for the project, and share Land Demarcation Summary	Project Manager	Project Manager		WEH
P1	Share Land Demarcation Summary with Lead PEM and direct initiation of preliminary works	WEH	WEH		Lead PEM
P2	Prepare the Preliminary Works Requirement Document	Lead PEM	Lead PEM		WEH
P3	Share the Preliminary Works Requirement Document with the Procurement Lead to initiate the RFQ process	Lead PEM	Lead PEM		Procurement Lead
P4	Conduct RFQ process and share received responses with Lead PEM for technical evaluation	Procurement Lead	Procurement Lead		Lead PEM
P5	Conduct technical evaluation of responses and shortlist Site Survey Consultants	Lead PEM	Lead PEM		
P6	Share the Shortlist of Site Survey Consultants with the Procurement Lead	Lead PEM	Lead PEM		Procurement Lead
P7	Assess the shortlisted Site Survey Consultants and hire one based on appropriate evaluation criteria	Procurement Lead	Procurement Lead		
E	Notify Project Manager of the hired Site Survey Consultant	Procurement Lead	Procurement Lead		Project Manager
KEY - S: Start P: Process Steps I: Input O: Output E: End					

2.2A.3 Process Map



2.2A.4 Templates for Input/ Output

3. Preliminary Works Requirement Document

Test Name	Description	Number of Blocks for Testing	Standard Block Size	Test Methodology	Timeline for Completion	Remarks, if any
Soil Testing	Testing soil composition and stability					
Geotechnical Survey	Survey for subsurface conditions					
Environmental Impact Assessment	Assess environmental factors and impacts					
Topographical Survey	Mapping the land surface features					
Hydrological Study	Assessment of water-related factors					
Seismic Survey	Evaluation of seismic risks					
Soil Permeability Test	Determining soil permeability for drainage					
....						

Chapter 2.2B – Preliminary Works Execution

2.2B.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	<ul style="list-style-type: none">Procurement Lead informs Project Manager of the hired SSC					-
P1	<ul style="list-style-type: none">Project Manager, in consultation with Lead PEM, conducts a meeting with the hired SSC to discuss detailed requirements (as detailed in Preliminary Works Requirement Document) and shares following inputs for conducting Preliminary Works –<ul style="list-style-type: none">Detailed Feasibility Report of Land Parcel¹Land Demarcation Summary²	I1	Preliminary Works Requirement Document			0.5
P2	<ul style="list-style-type: none">Project Manager liaises with the hired SSC to ensure timely submission of all deliverables, as detailed in Preliminary Works Requirement DocumentProject Manager facilitates the provision of any additional inputs/ data required to conduct the assessments <p>If Site Survey Consultants delay deliverables, Project Manager escalates to Procurement Lead, which follows up and evaluates whether the delay warrants any remuneration deductions as per the contractual terms</p>					1.5
P3	<ul style="list-style-type: none">Project Manager receives preliminary works deliverables from SSC			O1	Preliminary Works Deliverables	
P4	<ul style="list-style-type: none">Project Manager consolidates preliminary works deliverables received from the SSC	I2	Preliminary Works Deliverables	O2	Preliminary Works Deliverables Compilation	
KEY - S: Start P: Process Steps I: Input O: Output E: End ●: Detailed in cross-functional playbooks						

¹ Detailed Feasibility Report of the land parcel is created by technical consultants to assess the feasibility of land parcel for setting up Wind Power Plant. The document is covered in Pre-Development Playbook Chapter 1.2

² Land Demarcation Summary is the document prepared during the physical demarcation of the land parcel. The details of the template are covered in Pre-Development Playbook in Chapter 4.2 – Land Demarcation & Handover

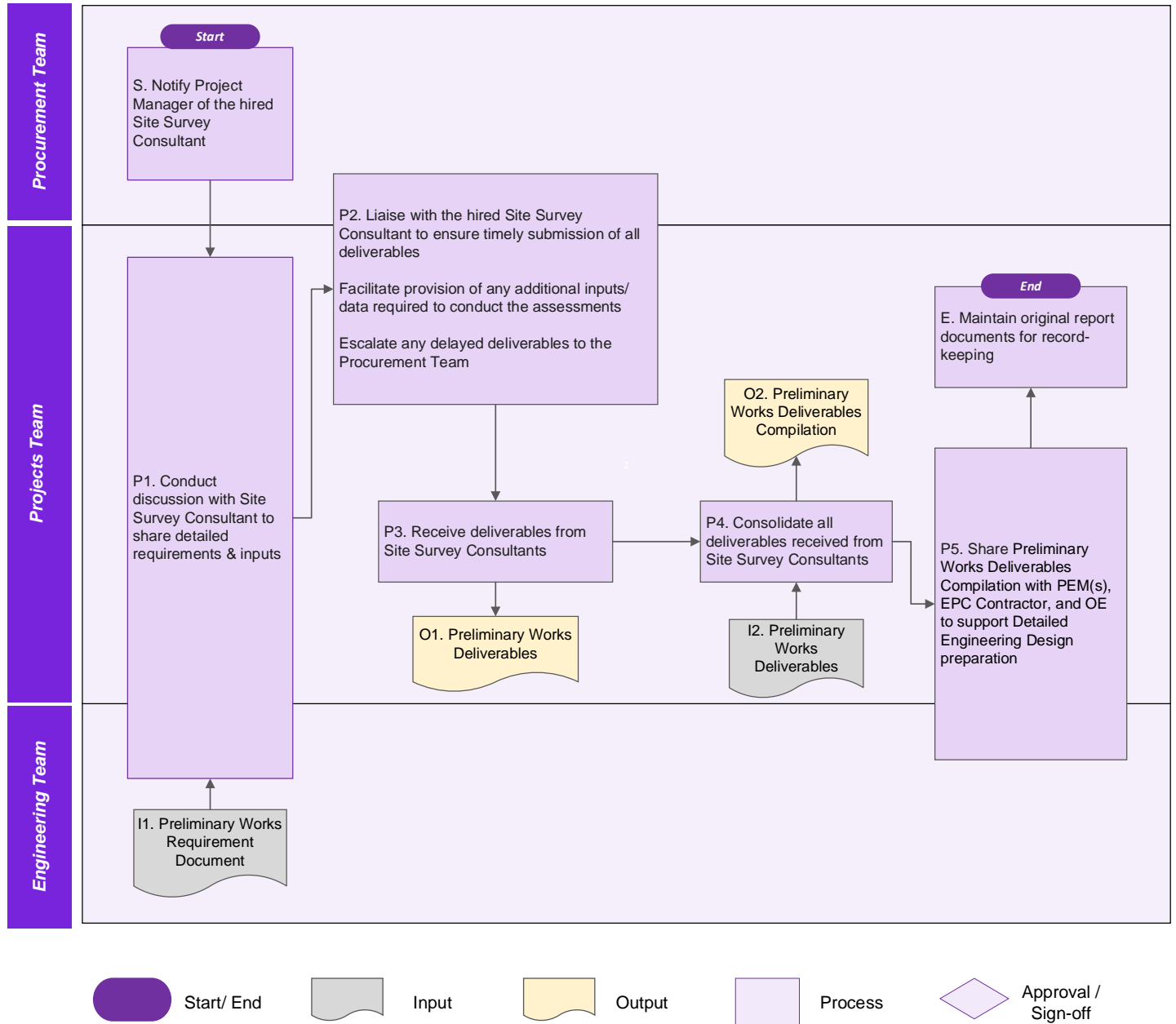
#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P5	– Project Manager shares a copy of Preliminary Works Deliverables Compilation with EPC Contractor, Owner’s Engineer (OE), and Project Engineering Managers(s) to support Detailed Engineering Design preparation					-
E	– Project Manager maintains all original report documents of Preliminary Works Deliverables Compilation with themselves for record-keeping					Total – 2 – 2.5 weeks
KEY - S: Start P: Process Steps I: Input O: Output E: End •: Detailed in cross-functional playbooks						

2.2B.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Notify Project Manager of the hired Site Survey Consultant	Procurement Lead	Procurement Lead		Project Manager
P1	Conduct discussion with Site Survey Consultant to share detailed requirements & inputs	Project Manager	Project Manager	Lead PEM	
P2	Liaise with the hired Site Survey Consultant to ensure timely submission of all deliverables	Project Manager	Project Manager		
	Facilitate provision of any additional inputs/ data required to conduct the assessments				
	Escalate any delayed deliverables to the Procurement Lead	Project Manager	Project Manager		Procurement Lead
P3	Receive deliverables from Site Survey Consultants	Project Manager	Project Manager		
P4	Consolidate all deliverables received from Site Survey Consultants into one compilation	Project Manager	Project Manager		
P5	Consolidate all deliverables & share with EPC, OE, and PEM(s)	Project Manager	Project Manager		PEM(s)
E	Archive original preliminary works reports for record-keeping	Project Manager	Project Manager		

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

2.2B.3 Process Map



Chapter 3.1 – Detailed Engineering Design for Plant Design

Part A – Appointment of Technical Consultant

3.1A.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Lead PEM consolidates all deliverables received from the Site Survey Consultants and concludes Preliminary Works					-
P1	– Lead PEM prepares the Technical Consultant Requirement Document, outlining: <ul style="list-style-type: none"> – Scope of engineering deliverables – Technical specifications and design expectations – Software/format requirements – Timelines as per Engineering Execution Plan 	I1	Engineering Execution Plan	O1	Technical Consultant Requirement Document (Template Provided)	0.5
P2	– Lead PEM shares the Technical Consultant Requirement Document with the Procurement Lead and requests initiation of the RFQ process					-
P3	– Procurement Lead modifies the standard RFQ template to incorporate project-specific requirements and circulates RFQ to empaneled consultants	I2	Technical Consultant Requirement Document	O2	RFQ for Technical Consultants	•
		I3	RFQ Template			
P4	– Procurement Lead receives responses from technical consultants, compiles them, and shares with Lead PEM for technical evaluation			O3	RFQ Responses from Technical Consultants	•

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P5	– Lead PEM reviews the RFQ responses for technical assessment and prepares a Shortlist of Technical Consultants	I4	RFQ Responses from Technical Consultants	O4	Shortlist of Technical Consultants (Template Provided)	0.5
P6	– Lead PEM shares the Shortlist of Technical Consultants with Procurement Lead for commercial evaluation and final selection					-
P7	– Procurement Lead assesses the shortlisted technical consultants, and finalizes appointment of one based on appropriate assessment criteria	I5	Shortlist of Technical Consultants			•
E	– Procurement Lead informs Lead PEM about the appointment Technical Consultant					Total – 1 – 1.5 weeks

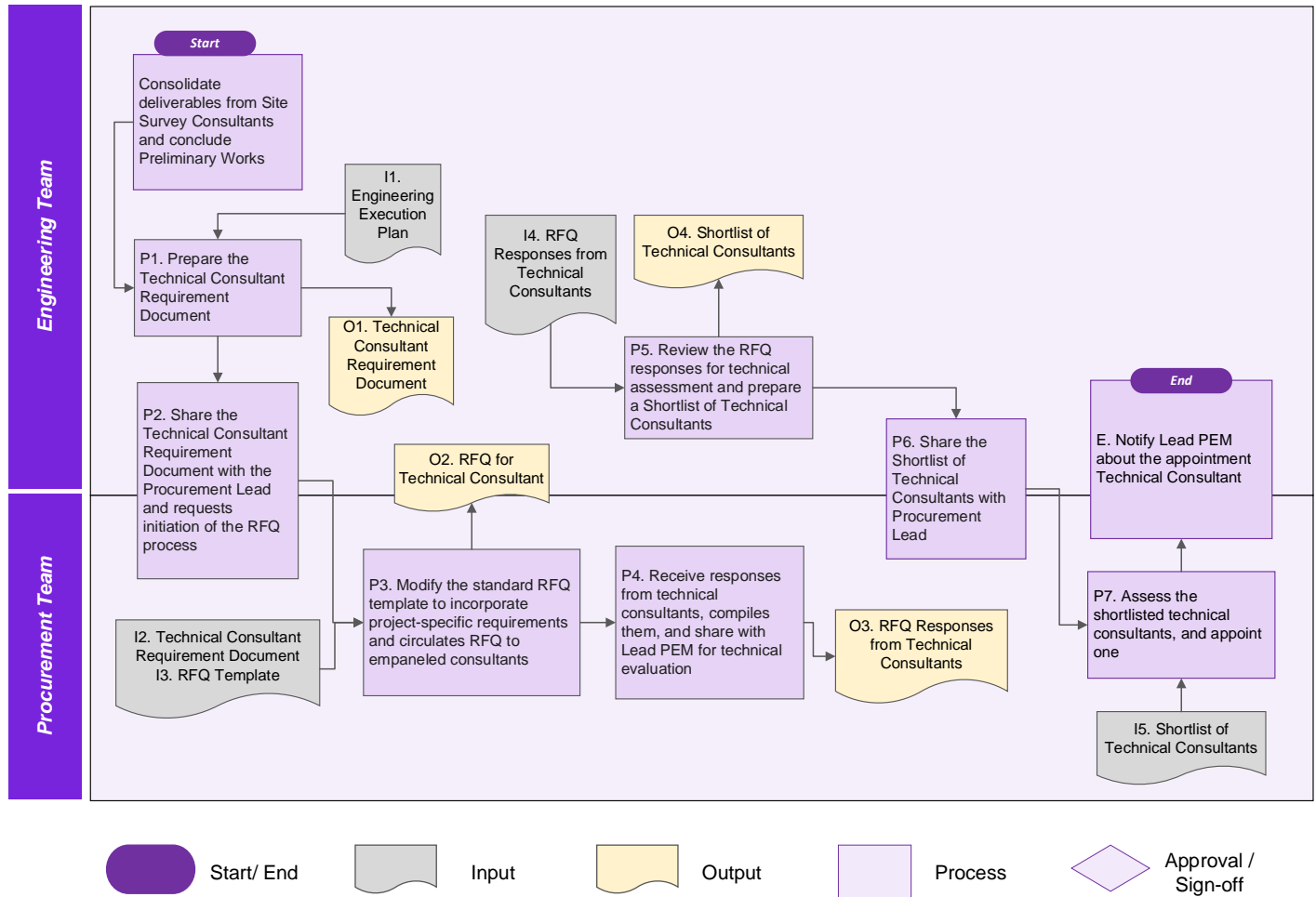
KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

3.1A.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Consolidate deliverables from Site Survey Consultants and conclude Preliminary Works	Lead PEM	Lead PEM		
P1	Prepare the Technical Consultant Requirement Document	Lead PEM	Lead PEM		WEH
P2	Share Requirement Document with Procurement Lead and request RFQ initiation	Lead PEM	Lead PEM		Procurement Lead
P3	Modify RFQ template and circulate to empaneled consultants	Procurement Lead	Procurement Lead		
P4	Receive and compile responses from consultants; share with Lead PEM	Procurement Lead	Procurement Lead		Lead PEM
P5	Review RFQ responses and prepare Shortlist of Technical Consultants based on technical assessment	Lead PEM	Lead PEM		
P6	Share shortlist with Procurement Lead for commercial evaluation and final selection	Lead PEM	Lead PEM		Procurement Lead
P7	Assess shortlisted technical consultants, and finalizes appointment of one based on appropriate assessment criteria	Procurement Lead	Procurement Lead		
E	Inform Lead PEM about the appointed Technical Consultant	Procurement Lead	Procurement Lead	–	Lead PEM

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

3.1A.3 Process Map



3.1A.4 Templates for Input/ Output

1. Technical Consultant Requirement Document

Section	Details
Project Name	
Date	
Prepared By	
Engineering Discipline	<ul style="list-style-type: none"> • Civil • Electrical • Plant Design • Multi-disciplinary
Scope of Work	<ul style="list-style-type: none"> • List key engineering deliverables expected from the consultant
Technical Specifications & Design Expectations	<ul style="list-style-type: none"> • Applicable codes and standards: IS/IEC/IEEE/etc. • Design criteria: site conditions, loading assumptions, environmental considerations • Specific design expectations: layout constraints, integration with existing infra, etc.
Software / Format Requirements	<ul style="list-style-type: none"> • Design software to be used: STAAD, ETAP, AutoCAD, PVSyst, etc. • Deliverable format: Editable CAD, PDF, Excel, DWG, IFC, etc.
Timelines (as per EEP)	<ul style="list-style-type: none"> • Draft Submission: DD/MM/YYYY • Internal Review: DD/MM/YYYY • Final Submission: DD/MM/YYYY

2. Shortlist of Technical Consultants

Consultant Name	Scope Fitment (Yes/ Partial/ No)	Relevant Experience (Projects / Years)	Software Capability (Yes / No)	Format Compliance (Yes / No)	Timelines Acceptable (Yes / No)	Shortlisted (Yes / No)	Remarks / Justification
Consultant A		e.g., 5 Wind projects in 7 years					
Consultant B							
Consultant C							

Part B – Detailed Engineering Design Preparation

3.1B.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Procurement Lead informs PEM (Plant Design) about the appointment Technical Consultant					-
P1	– PEM (Plant Design) conducts kick-off meeting with Technical Consultant to align on detailed requirements and timelines					0.5
P2	– PEM (Plant Design) and Technical Consultant jointly shortlist suitable WTG models based on market research and inputs from OEMs			O1	Shortlisted WTG Models (Template Provided)	0.5
P3	– PEM (Plant Design) shares Preliminary Works Report with Technical Consultant for PLF calculation					-
P4	– PEM (Plant Design) receives PLF reports for each shortlisted WTG model from Technical Consultants	I1	Shortlisted WTG Models	O2	PLF Reports	-
		I2	Preliminary Works Report			
P5	– PEM (Plant Design) review and validate the PLF reports shared by Technical Consultants	I3	PLF Reports			1
P6	– PEM (Plant Design) shares the PLF reports with Lead PEM, who further shares the reports with Procurement Lead					-
P7	– Procurement Lead runs the Wind Project Commercial Model using PLF data and WTG specs, and finalize the WTG model for the project based on appropriate assessment criteria	I4	PLF Reports	O3	Final WTG Model (Template Provided)	1
P8	– Procurement Lead informs Lead PEM about the finalized WTG model, who further informs the same to PEM (Plant Design)					-

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P9	– PEM (Plant Design) notifies the Technical Consultant and Land Aggregator about the selected WTG model					-
P10	– PEM (Plant Design) coordinates with Land Aggregator to receive micro siting and Detailed Engineering Deliverable for Plant Design <i>Land Aggregator to conduct micro siting and create Detailed Engineering Deliverable for Plant Design</i>			O4	Detailed Engineering Deliverables (draft)	3
P11	– PEM (Plant Design), in collaboration with Technical Consultant review micro siting Detailed Engineering Deliverable for Plant Design, and create the List of Modifications Required	I5	Detailed Engineering Deliverables (draft)	O5	List of Modifications Required	2
P12	– PEM (Plant Design) shares the List of Modifications Required with Land Aggregator					-
P13	– PEM (Plant Design) coordinates with Land Aggregator to receive final Detailed Engineering Deliverable for Plant Design			O6	Detailed Engineering Deliverables (Final)	2
E	– PEM (Plant Design) submits the finalized Detailed Engineering Deliverables to Lead PEM for sign-off and verification					Total – 10 – 12 weeks

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

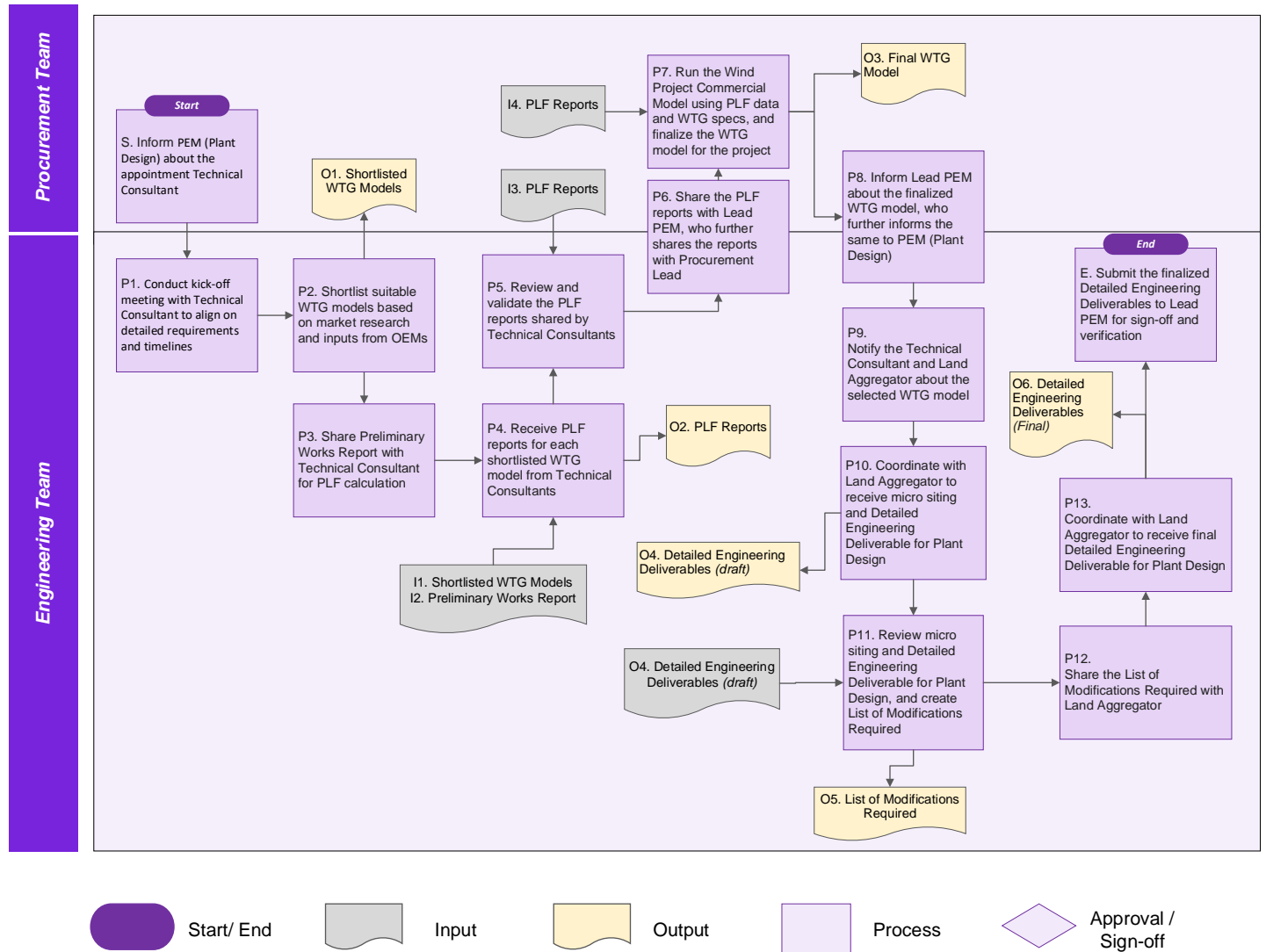
3.1B.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Inform Lead PEM about the appointed Technical Consultant	Procurement Lead	Procurement Lead	–	Lead PEM
P1	Conduct kick-off meeting with Technical Consultant to align on detailed requirements and timelines	PEM (Plant Design)			Lead PEM
P2	Shortlist 3–5 suitable WTG models for the project	PEM (Plant Design)			
P3	Share the shortlisted WTG models and Preliminary Works Report with Technical Consultant for PLF calculation	PEM (Plant Design)			
P4	Receive PLF reports for each shortlisted WTG model	PEM (Plant Design)	PEM (Plant Design)		
P5	Review and validate PLF reports shared by Technical Consultant	PEM (Plant Design)			
	Share PLF reports with Lead PEM	PEM (Plant Design)	PEM (Plant Design)		Lead PEM
P6	Share PLF report with Procurement Lead	Lead PEM	Lead PEM		Procurement Lead
P7	Leverage the PLF Report and WTG specifications to run Wind Project Commercial Model and finalize the most suitable WTG model	Procurement Lead	Procurement Lead		
	Inform Lead PEM about the finalized WTG model	Procurement Lead	Procurement Lead		Lead PEM
P8	Inform PEM (Plant Design) about the finalized WTG Model	Lead PEM	Lead PEM		PEM (Plant Design)
P9	Notify Technical Consultant and Land Aggregator about selected WTG model	PEM (Plant Design)	PEM (Plant Design)		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

#	Key Task	Responsible	Accountable	Consulted	Informed
P10	Coordinate with Land Aggregator to receive micro-siting & design deliverables	PEM (Plant Design)	PEM (Plant Design)		
P11	Review deliverables with Technical Consultant and create List of Modifications	PEM (Plant Design)	PEM (Plant Design)		
P12	Share List of Modifications with Land Aggregator	PEM (Plant Design)	PEM (Plant Design)		
P13	Coordinate to receive final Detailed Engineering Deliverables	PEM (Plant Design)	PEM (Plant Design)		
E	Submit final Detailed Engineering Deliverables to Lead PEM	PEM (Plant Design)	PEM (Plant Design)		Lead PEM

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

3.1B.3 Process Map



3.1B.4 Templates for Input/ Output

1. Shortlisted WTG Models

WTG Model	OEM Name	Rated Capacity (MW)	Rotor Diameter (m)	Hub Height (m)	Cut-in / Cut-out Wind Speed (m/s)	Compliance with Site Conditions	Preliminary PLF Suitability (Y/N)	Remarks / Notes
Model A								
Model B								
Model C								

2. Final WTG Model

WTG Model	OEM Name	Rated Capacity (MW)	Rotor Diameter (m)	Hub Height (m)	Cut-in / Cut-out Wind Speed (m/s)	Compliance with Site Conditions	Preliminary PLF Suitability (Y/N)	Finalization Status	Justification
Model A								Y	
Model B								N	
Model C								N	

Chapter 3.2 – Detailed Engineering Design for Electrical and Civil

3.2.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Lead PEM consolidates all deliverables received from the Site Survey Consultants and concludes Preliminary Works					-
P1	– Lead PEM reviews the Engineering Execution Plan ¹ (EEP) to identify <ul style="list-style-type: none"> – list of all engineering deliverables² to be executed throughout the project, – along with its associated timelines, and – execution strategy i.e. whether the designs will be created by EPC Contractor or Engineering Team 	I1	Engineering Execution Plan (EEP)			0.5
P2	Lead PEM informs the EPC Contractor and PEM(s) about the expected deliverables and timelines as defined EEP Expected deliverables include: <ul style="list-style-type: none"> – Detailed Engineering Design, and their associated Bill of Quantities (BoQ), and Bill of Services (BoS) 					0.5
P3	Lead PEM provides the necessary inputs to PEM(s) and the EPC Contractor for developing the expected deliverables. These include – <ul style="list-style-type: none"> Basic Engineering Design Guaranteed Technical Particulars (GTP) Preliminary BoQ and BoS Preliminary Works Reports Compilation Deliverables timeline, based on EEP Project Execution Approach (<i>for referencing the Value Engineering Target</i>) 					

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | ●: Detailed in cross-functional playbooks

¹ EEP is the plan made by Engineering Team during Planning Stage. The plan details list of all engineering deliverables to be executed throughout the project, its associated timelines, and execution strategy for all engineering design-related activities. The plan is detailed in section 1.4 of Planning Chapters

² Engineering deliverables include Engineering Design and 3D Modelling

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P4A	<u>For deliverables allocated to EPC Contractor</u> Lead PEM coordinates with the EPC Contractor to provide any additional inputs required for drafting deliverables					12 – 15 ¹
P4B	<u>For deliverables allocated to PEMs</u> – PEMs develop their respective deliverables They coordinate with Lead PEM for any additional data inputs required They refer the Detailed Engineering Design Library ² to leverage the designs created for past projects	I2	Basic Engineering Design			
		I3	GTP			
		I4	Preliminary BoQ & BoS			
		I5	Preliminary Works Reports Compilation			
P5	– Lead PEM coordinates with PEMs and the EPC Contractor to monitor progress, ensuring adherence to EEP timelines <i>Any delay in deliverable submission by EPC contractor to be escalated to Project team and procurement team</i>					
P6	– EPC Contractor and PEM(s) submit their Detailed Engineering Design, BoQ, and BoS on a rolling basis to the Lead PEM <i>(i.e., deliverables are to be submitted progressively upon completion, rather than waiting to finalize all before submission)</i>			O1	Detailed Engineering Design	
				O2	BoQ & BoS	
Combined Process Steps for 3.1B and 3.2						
P7	– Lead PEM compiles deliverables from the EPC Contractor and PEM(s)	I6	Detailed Engineering Design	O3	Detailed Engineering Deliverables Compilation	0.5
		I7	BoQ & BoS			
E	– Lead PEM initiates the sign-off and verification process of Detailed Engineering Deliverables Compilation					Total – 13 – 16 weeks
KEY - S: Start P: Process Steps I: Input O: Output E: End ●: Detailed in cross-functional playbooks						

¹ subject to 100% land availability; timelines may vary if land acquisition is incomplete

² Detail Engineering Design Library is a centralized archive of all detail engineering designs created for past projects. It serves as a ready-to-use resource for preparing and finalizing designs for future projects efficiently.

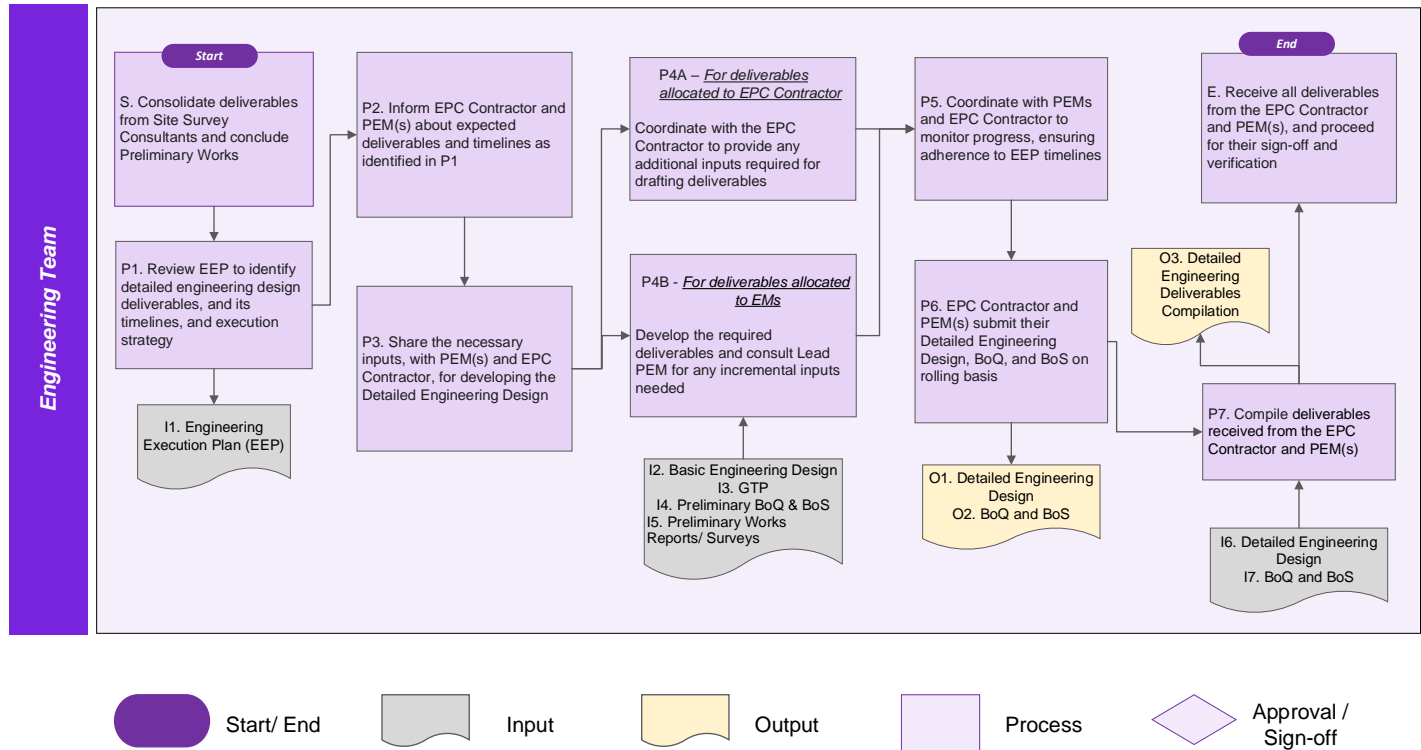
3.2.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Consolidate deliverables from Site Survey Consultants and conclude Preliminary Works	Lead PEM	Lead PEM		
P1	Review Engineering Execution Plan (EEP) to identify detailed engineering design deliverables, and its timelines, and execution strategy	Lead PEM	Lead PEM		
P2	Inform EPC Contractor and PEM(s) about expected deliverables and timelines as identified in P1	Lead PEM	Lead PEM		PEM(s)
P3	Share the necessary inputs to PEM(s) and the EPC Contractor for developing the Detailed Engineering Design	Lead PEM	Lead PEM		PEM(s)
P4A	<i>Deliverables by EPC Contractor</i> Coordinate with the EPC Contractor to provide any additional inputs required for drafting deliverables	Lead PEM	Lead PEM		
P4B	<i>Deliverables by PEMs</i> Develop the required deliverables and consult Lead PEM for any incremental inputs needed	PEM(s)	PEM(s)	Lead PEM	
P5	Monitor progress of EPC Contractor and PEMs to ensure adherence to EEP	Lead PEM	Lead PEM		
P6	Receive rolling submissions of deliverables (Designs, BoQ, BoS) from EPC Contractor and PEMs	Lead PEM	Lead PEM		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

#	Key Task	Responsible	Accountable	Consulted	Informed
P7	Compile deliverables received from EPC Contractor and PEMs	Lead PEM	Lead PEM		
E	Receive all deliverables from EPC Contractor and PEM(s) and proceed with sign-off and verification process	Lead PEM	Lead PEM		

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

3.2.3 Process Map



Chapter 4 – Sign-Off for Detailed Engineering Design

4.1 Process Steps

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Lead PEM receives Detailed Engineering Deliverables Compilation (<i>Engineering Designs, BoS and BoQ</i>) from the EPC Contractor/PEM(s) for sign-off and verification					-
P1	– Lead PEM shares the received Detailed Engineering deliverables Compilation with Owner's Engineer (OE) for review – For the deliverables submitted by EPC Contractor, respective Project Engineering Managers (PEMs) also receive the compilation for review					-
P2	– PEMs and OE independently review the compilation, preparing a list of proposed modifications, along with detailed justifications for each proposed modification	I1	Detailed Engineering Deliverables Compilation ¹	O1	OE's List of Modification (<i>Template Provided</i>)	0.5
				O2	PEM's List of Modification (<i>Template Provided</i>)	

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

¹ Detailed Engineering Deliverables Compilation includes Detailed Engineering Designs, along with their respective BoQ and BoS

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P3	<ul style="list-style-type: none"> Lead PEM facilitates discussions between the OE and PEM to collaboratively deliberate on their respective lists of proposed modifications During the discussion, PEM(s) categorizes the proposed modifications into two lists: <ul style="list-style-type: none"> Aligned Modifications List – Modifications where both the PEM and OE are in agreement Unaligned Modifications List – Modifications where the PEMs and OE have differing viewpoints 	I2	OE's List of Modification	O3	Aligned Modifications Lists ¹ (Template Provided)	1
	<p><i>Pre-meeting Preparation: To ensure structured and efficient discussions, PEMs and the OE independently review the designs and compile their modification lists in advance, as detailed in P2</i></p> <p><i>Three separate discussions are to be facilitated between the OE and PEMs, one for Civil, Electrical, and Plant Design respectively</i></p> <p><i>PEMs prepare the aforementioned lists for their respective Engineering Designs</i></p>	I3	PEM's List of Modification	O4	Unaligned Modifications Lists ¹ (Template Provided)	
P4	<ul style="list-style-type: none"> Lead PEM facilitates a discussion between respective PEMs, OE, and Wind Engineering Head (WEH) to discuss the unaligned modifications PEM(s) update their Aligned Modifications list to incorporate the modifications that reach consensus during the discussion WEH makes the final decision during the discussion 	I4	Unaligned Modifications List	O5	Final Modifications Lists (Template Provided)	0.5
P5	<ul style="list-style-type: none"> PEM(s) share their respective Final Modifications List with Lead PEM 					0.5
P6	<ul style="list-style-type: none"> Lead PEM shares the Final Modifications Lists to the EPC Contractor, for the designs created by them 					

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

¹ Separate lists to be prepared for Civil, Electrical and Plant Design

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P7	<ul style="list-style-type: none"> – PEM(s)/ EPC Contractor review the modifications requested, incorporate design changes and submit the modified Detailed Engineering Designs to the Lead PEM 	I5	Final Modification Lists	O6	Modified Detailed Engineering Deliverables ¹	1
P8	<ul style="list-style-type: none"> – Lead PEM shares the modified Detailed Engineering Design with OE for review – If the modified designs were submitted by EPC Contractor, the respective PEMs also receive these documents for review 					-
P9	<ul style="list-style-type: none"> – OE and PEMs sign off the detailed engineering design deliverables marking their approval (<i>OE to mark its verification stamp on every approved design</i>) <p><i>If disagreements persist between OE and PEMs, steps P2 to P8 are repeated until alignment and sign-off on the final Detailed Engineering Designs are achieved</i></p>	I6	Modified Detailed Engineering Deliverables ¹	O7	Approved Detailed Engineering Deliverables ¹	0.5
P10	<ul style="list-style-type: none"> – Lead PEM shares the Approved Detailed Engineering Deliverables with – – Procurement Lead and EPC contractor to facilitate subsequent procurement related activities – Project Manager and EPC contractor to commence subsequent construction and commissioning related activities 					-
E	<ul style="list-style-type: none"> – Lead PEM adds the Approved Detail Engineering Deliverables to the Detail Engineering Design library for future reference 					Total – 3.5 – 4 weeks

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

¹ Detailed Engineering Deliverables includes Detailed Engineering Designs, along with their associated BoQ and BoS

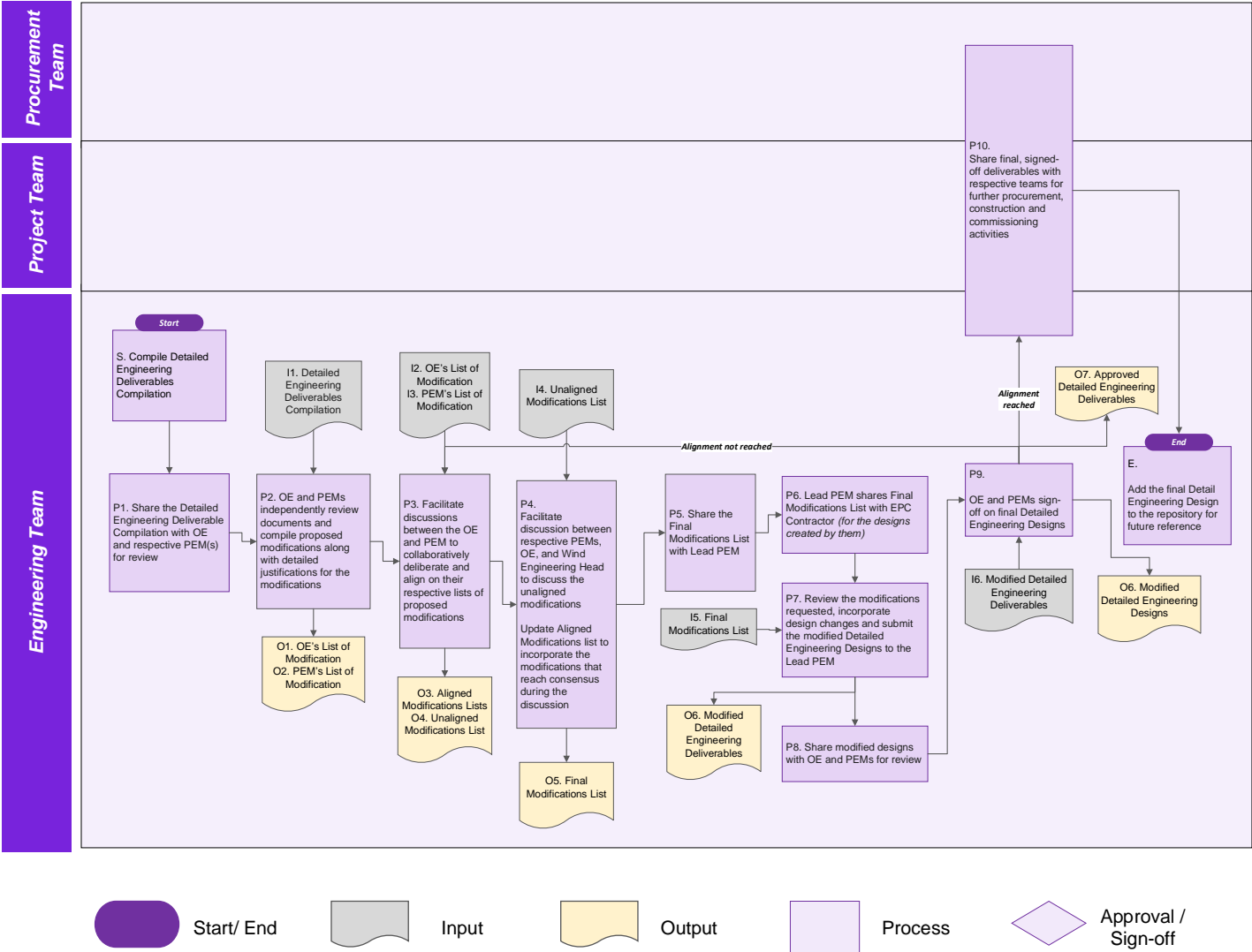
4.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Compile Detailed Engineering Deliverables (Engineering Designs, BoS, and BoQ) received from EPC Contractor/PEMs	Lead PEM	Lead PEM	PEM(s)	
P1	Share the deliverables (Detailed Engineering Designs, BoS, and BoQ) with OE and respective PEM(s) for review	Lead PEM	Lead PEM		PEM(s)
P2	Independently review compilation and prepare proposed modifications with justifications	PEM(s)	PEM(s)		Lead PEM
P3	Facilitate discussions between the OE and PEM to collaboratively deliberate and align on their respective lists of proposed modifications	Lead PEM		PEM(s)	WEH
P4	Facilitate discussion between respective PEMs, OE, and Wind Engineering Head to discuss the unaligned modifications	Lead PEM		PEM(s) WEH	
	Update Aligned Modifications list to incorporate the modifications that reach consensus during the discussion	PEM(s)	PEM(s)	WEH	
P5	Share the Final Modifications List with Lead PEM	PEM(s)	PEM(s)		Lead PEM
P6	Share the Final Modifications List with EPC Contractor (for the designs created by them)	Lead PEM	Lead PEM		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

#	Key Task	Responsible	Accountable	Consulted	Informed
P7	Review the modifications requested, incorporate changes, and submit the modified Deliverables to the Lead PEM	PEM(s)	PEM(s) - for designs created by them Lead PEM - for designs created by EPC Contractor		Lead PEM
P8	Share modified designs with OE and PEMs for review	Lead PEM	Lead PEM	PEM(s)	WEH
P9	Sign-off on final Detailed Engineering Designs	PEM(s)	Lead PEM		Lead PEM
P10	Share final, signed-off deliverables with respective teams for further procurement, construction and commissioning activities	Lead PEM	Lead PEM		Procurement Team / Project Team
E	Archive approved deliverables in the Detailed Engineering Design library	Lead PEM	Lead PEM		

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End

4.3 Process Map



4.4 Templates for Input/ Output

1. OE's List of Modification

Modification #	Discipline (Civil, electrical, plant design)	Deliverable / Drawing Name	Proposed Modification	Justification	Date of Submission

2. PEM's List of Modification

Modification #	Discipline (Civil, electrical, plant design)	Deliverable / Drawing Name	Proposed Modification	Justification	Date of Submission

3. Aligned Modifications List

Modification #	Discipline (Civil, electrical, plant design)	Deliverable / Drawing Name	Proposed Modification	Justification	Modification Suggested by (OE/PEM)

4. Unaligned Modifications List

Modification #	Discipline (Civil, electrical, plant design)	Deliverable / Drawing Name	Proposed Modification	Justification	Modification Suggested by (OE/PEM)	Reason for disagreement

5. Final Modifications Lists

Modification #	Discipline (Civil, electrical, plant design)	Deliverable / Drawing Name	Proposed Modification	Justification	Revised Design to be submitted by	Remarks, if any

Chapter 5 – Issue Resolution for Detailed Engineering Design

5.1 Process Steps

#	Activity		Inputs		Outputs	Timeline (in weeks)
S	<ul style="list-style-type: none"> Project Manager or Procurement Lead sends Engineering Issue Form to Lead Project Engineering Manager (Lead PEM) <p><i>Engineering Issue Form is a standardized document that records engineering challenges encountered during project execution. It categorizes each issue under one of three domains: Electrical, Civil, or Plant Design</i></p>					-
P1	<ul style="list-style-type: none"> Lead PEM notifies the respective Project Engineering Manager (PEM) based on the issue type (<i>Electrical, Civil, or Plant Design</i>) and shares the Engineering Issue Form with them 					-
P2	<ul style="list-style-type: none"> PEM reviews the Engineering Issue Form to assess the challenge and classifies it as one of the following: <ul style="list-style-type: none"> Case 1 - Component/Material related issue Case 2 - Engineering design related issue 	I1	Engineering Issue Form (Template Provided)			0.5
Case 1 - Component/Material related issue						
P3	<ul style="list-style-type: none"> PEM implements control measures by notifying the Procurement Lead/ Project Manager to suspend procurement of the affected component/material and related items until further notice 					-
KEY - S: Start P: Process Steps I: Input O: Output E: End •: Detailed in cross-functional playbooks						

#	Activity		Inputs		Outputs	Timeline (in weeks)
P4	<ul style="list-style-type: none"> – PEM, in consultation with the EPC Contractor, conducts a comprehensive assessment to determine the most effective corrective action¹, while minimizing disruptions to project timelines and execution – PEM refers to the Issue Log to identify similar challenges from past projects and the resolutions implemented 	I2	Engineering Issue Form	O1	Corrective Action (Template Provided)	1
P5	<ul style="list-style-type: none"> – PEM updates the product specifications and quantities in the BoQ to reflect the revised requirements, based on the identified corrective action 	I3	Corrective Action	O2	Updated BoQ	0.5
P6	<ul style="list-style-type: none"> – PEM informs the Procurement Lead to initiate procurement coordination in alignment with the updated BoQ 					-
P7	<ul style="list-style-type: none"> – PEM formally communicates the resolution to the submitter of the Engineering Issue Form by sharing the Engineering Issue Resolution Form, outlining the actions taken to address the reported issue 			O3	Engineering Issue Resolution Form (Template Provided)	0.5
E	<ul style="list-style-type: none"> – PEM adds the Engineering Issue Form and Engineering Issue Resolution Form to the Issue Log for future reference 					-

Case 2 - Engineering design related issue

P3	<ul style="list-style-type: none"> – PEM undertakes control measures, by requesting Project Team to suspend construction and commissioning activities related to the concerned engineering design until further notice 					-
P4	<ul style="list-style-type: none"> – PEM identifies the Design Owner of the engineering design (<i>EPC Contractor or the Engineering Team</i>) for the escalated issue and shares the Engineering Issue Form with the Design Owner 					-

KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | ●: Detailed in cross-functional playbooks

¹ Corrective action may involve –

- Requesting the supplier of the component to change specifications, quantity or contract terms, or
- Replacing the vendor for concerned item to accommodate for revised requirements

#	Activity		Inputs		Outputs	Timeline (in weeks)
P5	<ul style="list-style-type: none"> Design Owner conducts detailed assessment, and amends the engineering design to resolve the issue, while also trying to minimize disruptions to project timelines and execution They may leverage the Issue Log to identify similar issues faced in past projects and the resolution undertaken 	I2	Engineering Issue Form	O1	Modified Detailed Engineering Design	2.5
P6	<ul style="list-style-type: none"> Design Owner shares the Modified Detailed Engineering Designs with Lead PEM 					0.5
P7	<ul style="list-style-type: none"> Lead PEM initiates the sign-off and verification process for these designs <i>(as outlined in Chapter 4)</i> 	I3	Modified Detailed Engineering Design			-
P8	<ul style="list-style-type: none"> Lead PEM submits the Approved Modified Detailed Engineering Designs to the EPC Contractor and Project Team to proceed with construction and commissioning activities 			O2	Approved Modified Detailed Engineering Design	0.5
P9	<ul style="list-style-type: none"> Lead PEM formally communicates the resolution to the submitter of the Engineering Issue Form by providing the Engineering Issue Resolution Form, outlining the actions taken to address the reported issue 			O3	Engineering Issue Resolution Form	0.5
E	<ul style="list-style-type: none"> Lead PEM adds the Engineering Issue Form and Engineering Issue Resolution Form to the Issue Log for future reference 					Total – 3 – 8 weeks¹
KEY - S: Start P: Process Steps I: Input O: Output E: End •: Detailed in cross-functional playbooks						

¹ Total duration varies by issue type – case 1 is expected to resolve within 4 weeks, while case 2 may take up to 8 weeks

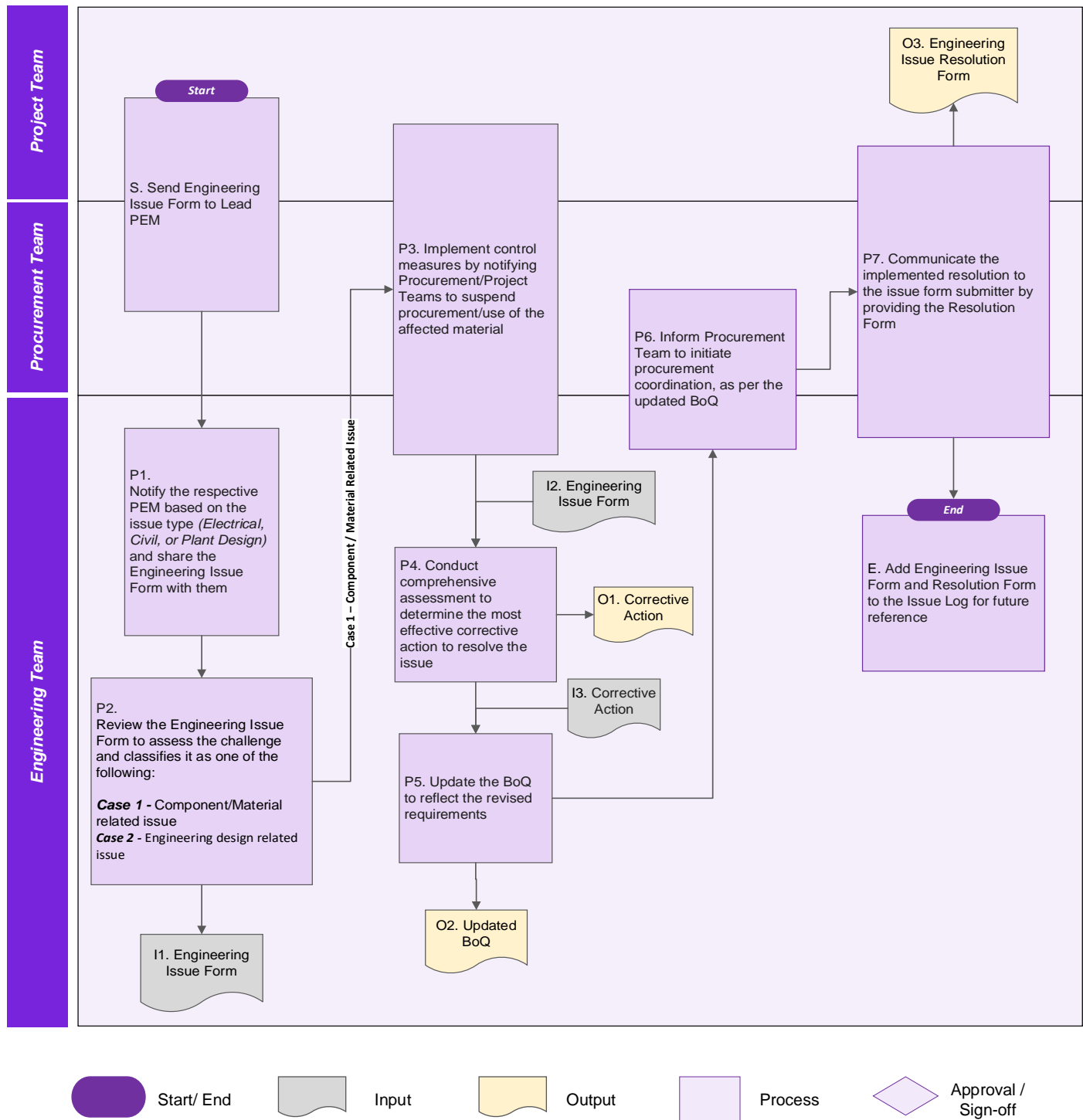
5.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Send the Engineering Issue Form to Lead PEM	Procurement Lead or Project Team	Procurement Lead or Project Team		Lead PEM
P1	Notify the respective PEM based on issue type and share the Engineering Issue Form	Lead PEM	Lead PEM		PEM
P2	Review the issue and classify it as component/material-related or engineering design-related issue	PEM	PEM		
Case 1 - Component/Material related issue					
P3	Implement control measures by notifying Procurement/Project Teams to suspend procurement/use of the affected material	PEM	PEM		Procurement Lead Project Team
P4	Conduct comprehensive assessment to determine the most effective corrective action to resolve the issue	PEM	PEM	EPC Contractor	
P5	Update the BoQ to reflect the revised requirements	PEM	PEM		WEH
P6	Inform Procurement Lead to initiate procurement coordination, as per the updated BoQ	PEM	PEM		Procurement Lead
P7	Communicate the implemented resolution to the issue form submitter by providing the Resolution Form	PEM	PEM		Procurement Lead Project Team (<i>whoever submitted the issue form</i>)
E	Add Engineering Issue Form and Resolution Form to the Issue Log for future reference	PEM	PEM		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

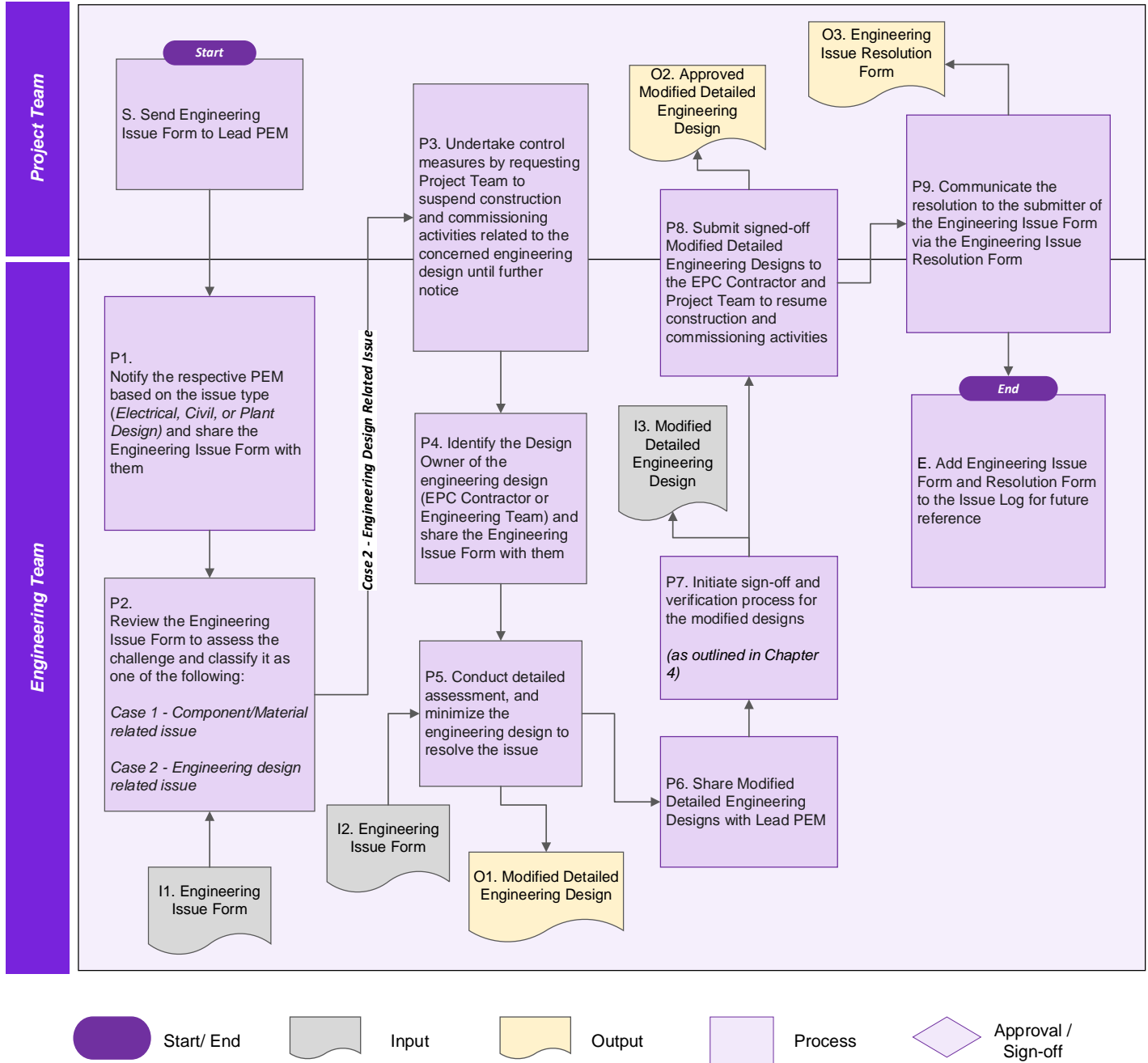
#	Key Task	Responsible	Accountable	Consulted	Informed
Case 2 - Engineering design related issue					
P3	Implement control measures by requesting Project Team to suspend construction and commissioning activities for the affected engineering design	PEM	PEM		Project Team
P4	Identify the Design Owner of the engineering design (EPC Contractor or Engineering Team) and share the Engineering Issue Form with them	PEM	PEM		Design Owner (EPC Contractor or Engineering Team)
P5	Conduct detailed assessment, and amends the engineering design to resolve the issue	Design Owner	Design Owner		PEM
P6	Share Modified Detailed Engineering Designs with Lead PEM	Design Owner	Design Owner		Lead PEM
P7	Initiate sign-off and verification process for the modified designs	Lead PEM	Lead PEM		WEH
P8	Submit signed-off Modified Detailed Engineering Designs to the EPC Contractor and Project Team to resume construction and commissioning	Lead PEM	Lead PEM		Project Team
P9	Communicate the implemented resolution to the issue form submitter via Resolution Form	PEM	PEM		Project Team (or whoever submitted the issue form)
E	Add Engineering Issue Form and Resolution Form to the Issue Log for future reference	PEM	PEM		
KEY - S: Start P: Process Steps I: Input O: Output E: End					

5.3 Process Map

Case 1 - Component/Material related issue



Case 2 - Component/Material related issue



5.4 Templates for Input/ Output

1. Engineering Issue Form

Field	Details
Issue ID	Auto-generated or assigned manually
Date of Submission	DD/MM/YYYY
Submitted By	Name – Project Manager / Procurement Lead
Submitting Function	Project / Procurement
Project Name	Name of the project
Package/Section	e.g., WTG area, Switchyard / Pooling Substation, etc.
Discipline	Civil / Electrical / Plant Design
Type of Document	Engineering Drawing / BoQ / Other
Document Name & Number	Exact name and reference number of the drawing or BoQ in question
Issue Description	Clear articulation of the issue observed – inconsistency, omission, etc.
Potential Implication	Optional – If known, impact on procurement, construction, or schedule
Submitted To (Engineering)	Name of Lead PEM / Engineering Team POC
Remarks (optional)	Any additional observations or context

2. Corrective Action Plan

Field	Details
Corrective Action Report ID	Auto-generated or assigned manually
Linked Engineering Issue ID	Reference ID from Engineering Issue Form
Date of Report	DD/MM/YYYY
Reported By	Name of PEM
Engineering Discipline	Civil / Electrical / Plant Design
Package/Component Affected	e.g., WTG area, Switchyard / Pooling Substation, etc.
Description of Issue	Summary of issue reported
Category of Issue	Component / Material related issue Engineering design related issue
Procurement/ Construction Hold Notification Sent To	Procurement Lead / Project Manager name
Date of Procurement/ Construction Hold	DD/MM/YYYY
Assessment Conducted With EPC?	Yes / No – Include meeting date if applicable
Assessment Summary	Key observations and considerations discussed with EPC
Reference to Similar Past Issues	Yes / No – Mention Issue ID from Issue Log if applicable
Proposed Corrective Action	e.g., Replace with alternate spec, Upgrade material, Reconfirm specification
Impact on Design / BoQ	Description of required modifications
Updated BoQ Version	Version number or date
Date of Update Completion	DD/MM/YYYY
Remarks	Any additional comments or follow-ups needed

3. Engineering Issue Resolution Form

Field	Details
Resolution Form ID	Auto-generated or assigned manually
Linked Engineering Issue ID	Reference ID from the original Engineering Issue Form
Date of Resolution Submission	DD/MM/YYYY
Submitted To	Name of Project Manager / Procurement Lead who raised the issue
Submitted By	Name of Lead PEM
Engineering Discipline	Civil / Electrical / Plant Design
Package / Section Affected	e.g., WTG area, Switchyard / Pooling Substation, etc.
Summary of Reported Issue	Brief recap of issue description from original form
Assessment Summary	Key findings from the engineering team's review
Category of Issue	Component / Material issue Engineering Design issue
Corrective Action Taken	Steps implemented to resolve the issue – redesign, spec revision, etc.
Changes Made	List of documents modified – BoQ, Drawings, Specs, with version numbers
Procurement / Execution Impact	Summary of any implications or changes required from their end
Updated Documents Attached	List of attached updated files if applicable
Resolution Completion Date	DD/MM/YYYY
Additional Remarks (if any)	Optional – Any further clarifications, precautions, or notes

Chapter 6 – Assessment of OE Empanelment Requirements

6.1 Process Steps

Process to be initiated on a bi-annual basis

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
S	– Chief Business Development shares the Annual Growth Outlook ¹ (and its subsequent quarterly updates) with the Wind Engineering Head (WEH)					-
P1	– WEH designates an Engineering Manager (EM) to evaluate the requirement for empaneling new OE – WEH shares the Annual Growth Outlook with the appointed EM to aid evaluation					0.5
P2	– EM analyzes the Annual Growth Outlook to identify target regions and assess the demand for empaneling OE in each region	I1	Annual Growth Outlook			0.5
P3	– EM requests the Procurement Leads to share the Vendor Scorecard ² for the empaneled OE					0.5
P4	– Procurement Leads shares the requested vendor scorecards with the EM					
P5	– For each target region, EM assesses the adequacy of empaneled OE based on their – – Number in each region – Competence and work quality, based on Engineering Team's feedback in the Vendor Scorecard	I2	Vendor Scorecard			1
P6	– EM creates a Gap Assessment Summary, identifying regions where the empaneled vendors are insufficient to meet the projected demand			O1	Gap Assessment Summary (Template Provided)	

– **KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | ●: Detailed in cross-functional playbooks**

¹ Annual Growth Outlook is prepared based on the overall growth strategy in Renewable Energy. It outlines projected evacuation and land requirements, based on market trends, Torrent's current market standing and growth projections, and central and state-level renewable energy policies. The document covers locations to focus on (states/regions), target capacity for each location and other critical details

² Vendor Scorecard tracks feedback on service vendors from past engagements and is maintained by the Procurement Lead

#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
P7	– EM shares OE Gap Assessment Summary with Procurement Lead and requests them to initiate RFI for empaneling the required OE					-
P8	<ul style="list-style-type: none"> – EM supports the Procurement Lead in preparing the RFIs – EM defines the Pre-Qualification Criteria (PQC) and drafts technical assessment section¹ of the RFI – Procurement Lead drafts all other sections² of the RFIs (<i>detailed in Procurement Playbook</i>) 			O2	RFI (PQC and Technical Assessment sections)	0.5
P9	– Procurement Lead publishes the RFI, collates and shares responses with EM for technical evaluation			O3	RFI Responses	•
P10	– EM evaluates the PQCs and technical assessment section of the RFI responses, and creates the List of feasible OEs	I3	RFI Responses	O4	List of Feasible OEs (Template Provided)	0.5
P11	– EM seeks review and approval from WEH on the List of Feasible OEs					0.5
P12	– If changes are required, EM incorporates the feedback and reshapes with WEH for approval, to finalize the List of Feasible OEs					
P13	– EM shares the List of Feasible OEs with the Procurement Lead					-
P14	<ul style="list-style-type: none"> – Procurement Lead evaluates feasible OEs and finalizes those to be empaneled based on appropriate criteria – Procurement Lead shares the list of Empaneled OEs with EM 	I4	List of Feasible OEs	O5	Empaneled OEs (Template Provided)	•

– KEY - S: Start | P: Process Steps | I: Input | O: Output | E: End | •: Detailed in cross-functional playbooks

¹ PQC includes pre-requisites (e.g., minimum 10 years in land aggregation), and required capabilities

² RFI Overview & Objectives, Submission Guidelines, Evaluation Process, Commercial Terms, Compliance & Legal Requirements, Confidentiality & Disclosures

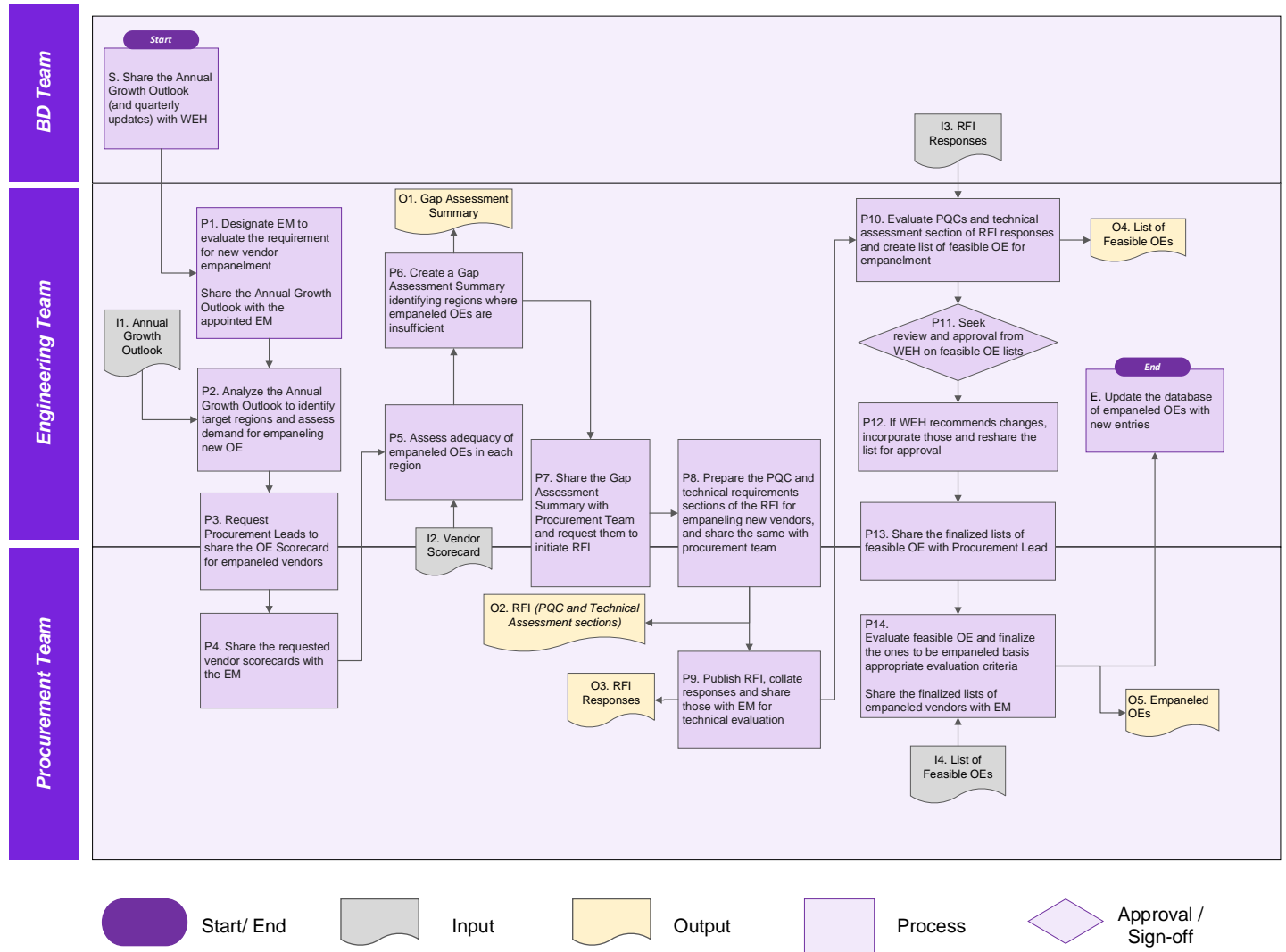
#	Activity	#	Inputs	#	Outputs	Timeline (in weeks)
E	– EM updates their database of Empaneled Vendors with new entries as shared by Procurement Lead					Total – 4 – 5 weeks
KEY - S: Start P: Process Steps I: Input O: Output E: End ●: Detailed in cross-functional playbooks						

6.2 RACI

#	Key Task	Responsible	Accountable	Consulted	Informed
S	Share the Annual Growth Outlook (and quarterly updates) with the Wind Engineering Head (WEH)	Chief Business Development	Chief Business Development		WEH
P1	Designate Engineering Manager (EM) to evaluate the requirement for new OE empanelment	WEH	WEH		EM
	Share the Annual Growth Outlook with the appointed EM	WEH			EM
P2	Analyze the Annual Growth Outlook to identify target regions and assess demand for empaneling new OE	EM	EM		WEH
P3	Request the Procurement Lead to share the Vendor Scorecard for empaneled OE	EM			Procurement Lead
P4	Share the requested OE Scorecards with the EM	Procurement Lead			EM
P5	Assess adequacy of empaneled OE in each region	EM	EM		
P6	Create OE Gap Assessment Summary, identifying regions where empaneled OE are insufficient	EM	EM		WEH
P7	Share the OE Gap Assessment Summary with Procurement Lead and request them to initiate RFI process	EM			Procurement Lead
P8	Prepare the PQC and technical requirements sections of the RFI for empaneling new OE, and share the same with Procurement Lead	EM	EM		Procurement Lead
P9	Publish RFI, collate responses and share those with EM for technical evaluation	Procurement Lead	Procurement Lead		EM
KEY - S: Start P: Process Steps I: Input O: Output E: End					

#	Key Task	Responsible	Accountable	Consulted	Informed
P10	Evaluate RFI responses (focusing on PQC's and technical response) and create lists of feasible OE	EM	EM		
P11	Seek review and approval from WEH on feasible OE lists from WEH	EM	EM	WEH	
P12	If WEH recommends changes, incorporate those and reshare the lists for approval	EM	EM	WEH	
P13	Share the finalized lists of feasible OE with the Procurement Lead	EM	EM		Procurement Lead
P14	Evaluate the feasible OEs and finalize those to be empaneled based on appropriate evaluation criteria	Procurement Lead	Procurement Lead		
	Share the lists of empaneled OE with EM	Procurement Lead			EM
E	Update the database of empaneled OE with newly approved entries	EM			
KEY - S: Start P: Process Steps I: Input O: Output E: End					

6.3 Process Map



6.4 Templates for Input/ Output

1. Gap Assessment Summary

Region	Projected Demand for OE	Available Empaneled OE	Quality of Available OE (High / Medium / Low)	Adequacy Status (Adequate / Inadequate)	New OE to be Empaneled	Remarks / Action Plan
Gujarat	5	2	Medium	Inadequate	2 – 4	Onboard at least 2 new OE; initiate empanelment process by June
Maharashtra	4	3	High	Adequate	0	None required

2. List of Feasible OE

OE Name	Region(s) Covered	PQC Compliance	Technical Suitability	Experience (Years)	Previous Engagements	Feedback from Engineering Team	Action Required	Reason for Shortlist / Reject
OE 1	Maha-rashtra, Gujarat	Yes	High	10	5 Wind Projects of 100+ MW	Positive	Shortlist	Meets PQC, high industry experience
OE 2	Maha-rashtra, Gujarat	No	Low	7	1 Wind Projects of 100+ MW	Negative	Reject	Does not meet PQC

3. List of Empaneled Land Aggregators

OE Name	Region(s) Covered	Empaneled Date
OE 1	Maharashtra, Gujarat	15/07/2025
OE 2	Rajasthan, MP	15/07/2025

Key Performance Indicators

Following KPIs are to be tracked for engineering function to measure the effectiveness of processes and identify areas for improvement

Metric	Definition	How to Calculate
Project Delay Attributable to in-house Engineering deliverable delay <i>(calculated in weeks)</i>	Delay in the overall project timeline caused by delays in timely submission of in-house engineering deliverable	Calculated as the difference between the planned and actual submission dates of in-house engineering deliverables, for cases where the delay caused a shift in the overall project timeline, i.e. impacted the dependent activities in the critical path
Average Issue Resolution days <i>(calculated in days)</i>	Measures the median days taken to resolve engineering issues	Calculated as the median days taken to resolve issues (difference between the date the Engineering Issue Form was received and the date the Engineering Issue Resolution Form was sent)
Total number of Issue Forms raised <i>(calculated as absolute number)</i>	Tracks the total number of issues faced by other teams during project execution	Count of all Engineering Issue Forms raised for a particular project

Glossary

Abbreviation	Full Form
BD	Business Development
BoQ	Bill of Quantities
BoS	Bill of Services
EEP	Engineering Execution Plan
EM	Engineering Manager
EPC	Engineering, Procurement, and Construction
GTP	Guaranteed Technical Particulars
L1 Plan	Level 1 Project Plan
OE	Owner's Engineer
PEM	Project Engineering Manager
PQC	Pre-Qualification Criteria
RFI	Request for Information
RFQ	Request for Quotation
WEH	Wind Engineering Head
TPI	Third-Party Inspection