



TRANSMISSION ENGINEERING · STEP 03 · DETAILED DESIGN · SCHEDULE

Transmission Line Design Package

Tower spotting plan, sag-tension calculations, foundation selection and conductor/OPGW schedules for the interconnecting line.

Worked example (anonymised): Standalone BESS Interconnection Package · 400 MW / 800 MWh BESS with 220 kV pooling substation · Western India. Detailed design of a 220 kV pooling substation, associated P&C; schemes and a 12 km double-circuit line package connecting the BESS to the state transmission utility's grid substation.

Sample excerpt · Tower Spotting Summary (Sample Section)

Tower No.	Type	Span (m)	Height (m)	Foundation Type	Terrain
T-14	Tangent (A)	320	24	Pad & Chimney	Plain
T-15	Angle (B)	280	27	Pyramid	Undulating
T-16	Tangent (A)	310	24	Pad & Chimney	Plain
T-17	Section (C)	260	30	Well Foundation	River Crossing
T-18	Tangent (A)	305	24	Pad & Chimney	Plain

Notes

- Sag-tension calculated for maximum design wind and temperature per IS 802
- River crossing tower designed with well foundation per soil report

What happens in this step

1. Finalise single line diagrams (SLDs), bus arrangements and bay layouts based on approved load flow, short circuit and stability study outputs
2. Prepare substation general arrangement (GA), sectional and equipment layout drawings including clearances as per CEA/CBIP guidelines
3. Develop protection & control philosophy, relay coordination studies, and P&C; schematics for line, transformer and bus protection
4. Design SCADA/RTU architecture, communication network topology (OPGW/fibre), and interface points with the utility's control centre
5. Prepare transmission line design package: tower spotting, sag-tension calculations, foundation type selection and conductor/OPGW schedules
6. Cross-discipline clash check and constructability review across civil, electrical and protection drawings
7. Issue design packages for internal design review, statutory vetting, and procurement-ready issuance

Outcomes

- Construction-ready substation and line drawings accepted by the utility with minimal revision cycles
- Protection coordination validated against the utility's existing relay settings, avoiding nuisance tripping
- SCADA architecture pre-aligned with the load dispatch centre's interface standards, reducing commissioning delays
- Single integrated design package enabling faster, cleaner EPC tendering and vendor bid comparison

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