



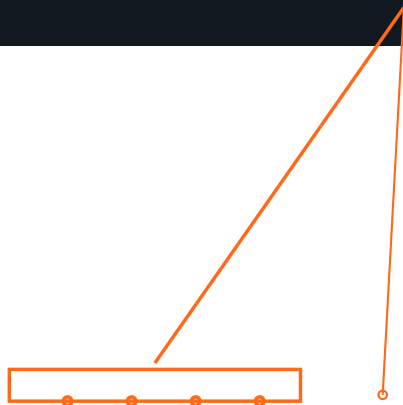
JMR LIFTING SOLUTIONS

Certified Heavy Lift Engineering

LIFT PLAN

400kV Substation Transformer Placement

Plan number: LP-2026-008



CLIENT	[CLIENT CONFIDENTIAL]
LOCATION	[LOCATION CONFIDENTIAL]
REVISION	Rev 0 — SAMPLE
DATE	02 August 2026
PREPARED BY	Muthuraj Jeyabal, LEEA Certified Appointed Person
AP CERTIFICATE NO.	8234-13608-8667-27-1
REVIEWED BY	JMR Lifting Engineering
STANDARDS	BS 7121 · LOLER 1998 · ASME B30

01 Executive Summary & Scope

Placement of a 400kV power transformer, filled with insulating fluid, onto its foundation plinth within an operating grid substation using a lattice boom truck crane.

Key Parameters

Parameter	Value
Load weight (t)	340 t
Dimensions (L × W × H)	Approx. 9 m x 4.5 m x 5.5 m
Lift radius (m)	12 m
Lift height (m)	8 m
Duration (est.)	8 hrs
Location	Grid substation

Critical Risks

- Load overload beyond crane rated capacity at working radius
- Loss of control during dynamic/weather-sensitive lift phases
- Rigging failure due to incorrect sling angle or WLL selection
- Ground/foundation bearing failure under crane or outrigger loads

02 Load Data, Centre of Gravity & Dimensions

400kV power transformer with fluid, delivered by rail/road transporter and lifted onto foundation plinth.

Weight Breakdown

Component	Weight
Transformer tank & core	268.0 t
Insulating fluid	58.0 t
Bushings/radiators/fittings	10.5 t
Uncertainty allowance (1.0%)	3.5 t
Total	340.0 t

Centre of Gravity

Parameter	Value
X-axis	4.5 m from LV end (X)
Y-axis	0.0 m (Y)
Z-axis	2.3 m above tank base (Z)

Lift Points

4 no. certified lifting lugs on tank top, per manufacturer lifting drawing

Dimensional Sketch

Simplified load outline with centre-of-gravity marker (not to scale):



03 Crane Selection & Configuration

Selected Crane: Liebherr LG 1750 lattice truck

Parameter	Value
Rated capacity	750 t
Boom length	63 m
Configuration	SL2DB main boom 63 m
Working radius	12 m
Capacity at working radius	510 t

Utilization Calculation

$(340 \times 1.10) / 510 = 73\%$. Foundation bearing capacity to be verified.

Utilization result: **73%** (within 85% safe working threshold)

Ground Bearing Pressure

Ground bearing = $(\text{crane wt } 260 \text{ t} + \text{load} \times \text{DAF } 374 \text{ t}) \times 9.81 / 54 \text{ sqm} = 115.2 \text{ kPa}$

Standing / Pick Radius

Working radius maintained at 12 m throughout the critical lift phase.

04 Load Chart & Utilization Calculation

Manufacturer load chart extract for the selected boom/jib configuration:

Radius	Capacity
8 m	640 t
10 m	570 t
12 m → WORKING POINT	510 t
14 m	455 t
16 m	405 t

Dynamic Amplification Factor (DAF)

DAF applied: **1.1**

Total Lifted Load Including DAF

$(340 \times 1.10) / 510 = 73\%$. Foundation bearing capacity to be verified.

Ground Pressure Calculation

Ground bearing = $(\text{crane wt } 260 \text{ t} + \text{load} \times \text{DAF } 374 \text{ t}) \times 9.81 / 54 \text{ sqm} = 115.2 \text{ kPa}$

Parameter	Value
Calculated ground pressure	115.2 kPa
Allowable bearing pressure	200 kPa
Crane pad / matting	Reinforced hardstand, foundation bearing capacity verified by geotech report

05 Rigging Configuration

Parameter	Value
Sling type	4-leg wire rope sling set, 6x36 IWRC EIPS
Sling angle (min.)	65°
Number of slings	4
WLL per sling	120 t
Shackle grade	Crosby G-2140 150 t bow shackle
Spreader / master link	4-leg direct bridle to tank lugs (no spreader beam)

Rigging Schematic (Summary)

Component	Specification
Hook / block	Rated to crane main hoist capacity, latch-equipped
Master link / spreader	4-leg direct bridle to tank lugs (no spreader beam)
Sling legs	4 × 4-leg wire rope sling set, 6x36 IWRC EIPS
Shackles	Crosby G-2140 150 t bow shackle
Sling angle from horizontal	65° (minimum safe angle 60° unless noted)

Sling Length Calculation

With a sling angle of 65° from horizontal, sling length is derived from headroom and spread geometry per rigging arrangement drawing; angle maintained $\geq$ the minimum safe angle for the configuration.

06 Rigging Load Calculations

Individual Sling Load

Formula: Sling load = (Load × DAF) ÷ (n × sin θ)

(340 × 1.10) / (4 × sin 65deg) = 103.0 t per sling -> select 120 t WLL sling

Parameter	Value
Calculated sling load	103.0 t
Selected sling WLL	120 t
Sling utilization	85.8%
Sling safety factor (design)	5:1 minimum
Shackle safety factor (design)	4:1 minimum

Safety Factor Basis

All wire rope slings are selected to a minimum design factor of 5:1 against minimum breaking load, in accordance with LEEA COPSULE guidance. All shackles are selected to a minimum design factor of 4:1. Working load limits (WLL) are marked and certificated per item.

07 Ground Bearing & Site Layout

Ground Bearing Pressure

Ground bearing = (crane wt 260 t + load x DAF 374 t) x 9.81 / 54 sqm = 115.2 kPa

Parameter	Value
Ground bearing pressure (required)	115.2 kPa
Allowable bearing pressure (site)	200 kPa
Margin	42.4% below allowable

Crane Pad / Matting

Reinforced hardstand, foundation bearing capacity verified by geotech report

Site Plan (Schematic)

Simplified site layout showing crane standing position, load path, and exclusion zone (not to scale):



08 Risk Assessment (BS 7121 Format)

Risk scoring uses Likelihood (L) × Severity (S), each rated 1–5. Residual score after controls is shown in the right-hand columns.

Hazard	L	S	Score	Controls	L	S	Score
Overload beyond crane capacity	3	5	15	Load chart verified; utilization capped below 85%; independent AP check	1	5	5
Crane mechanical/structural failure	2	5	10	Pre-use inspection; current LOLER thorough examination certificate	1	5	5
Load drop during lift	2	5	10	Certified rigging, redundant sling legs, trial lift at 25% load	1	5	5
Adverse weather conditions	3	3	9	Weather forecast monitoring; defined go/no-go thresholds	1	3	3
Personnel struck by load/rigging	3	4	12	Exclusion zone enforced; banksman control; no personnel under suspended load	1	4	4
Ground/foundation failure	2	5	10	Ground bearing calculation verified; crane mats/pads sized to load	1	4	4
Sling/shackle failure	2	5	10	Certified rigging to 5:1 (sling) / 4:1 (shackle) design factor; pre-use inspection	1	5	5
Overhead obstruction contact	2	4	8	Route survey completed; spotter assigned; boom angle indicator monitored	1	3	3
Foundation overload	2	4	8	Geotechnical bearing verification completed prior to mobilization; steel mats under crane tracks	1	4	4

Risk score key: **1–6 Low** · **7–12 Medium** · **13–25 High** — all residual scores must be Low or Medium with documented additional controls before lift authorization.

09 Method Statement

1. Confirm current LOLER thorough examination certificates for crane(s), rigging, and lifting accessories.
2. Conduct toolbox talk with all lift personnel; confirm roles per Section 11.
3. Establish exclusion zone and barrier the lift area; brief banksman and signaller.
4. Position crane(s) on verified ground bearing / matting per Section 07; set outriggers (if mobile) to full extension.
5. Rig load per configuration in Section 05; attach taglines; conduct visual rigging inspection.
6. Perform trial lift: raise load approximately 300 mm, hold at 25% of test criteria for a minimum dwell to verify rigging geometry, crane response, and brake holding.
7. Confirm sling angles, load indicator readings, and COG behavior match plan before proceeding.
8. Execute main lift at working radius 12 m
9. Travel/luff/slew load along planned path, maintaining radius and load chart compliance throughout.
10. Position load over set point; lower under controlled taglines to final bearing/foundation.
11. Confirm secure landing, release rigging tension gradually, and inspect for damage.
12. De-rig, remove accessories, and return crane to travel/stow configuration.
13. Conduct post-lift debrief and close out permit-to-work documentation.

10 Roles & Responsibilities

Role	Assignment
Appointed Person	Muthuraj Jeyabal, LEEA Certified Appointed Person (Cert. No. 8234-13608-8667-27-1) — overall lift planning responsibility
Lift Supervisor	[TBD — assigned at mobilization, LEEA/CPCS certified]
Crane Operator(s)	[Certified operator(s), current CPCS/NPORS or equivalent license]
Slinger / Signaller	[Certified slinger/signaller per LEEA/CPCS standard]
Banksman	[Certified banksman — controls exclusion zone and ground personnel]
Reviewed by	JMR Lifting Engineering

Contact

JMR Lifting Solutions — contact@jmrlifting.com

SAMPLE

11 Approvals & References

Signature Block

Role	Name	Signature / Date
Appointed Person	Muthuraj Jeyabal, LEEA Certified Appointed Person	
Client Representative	[CLIENT CONFIDENTIAL]	
HSE Representative	[TBD]	
Client Project Manager	[CLIENT CONFIDENTIAL]	

References

- BS 7121-1:2016 — Code of practice for the safe use of cranes
- LOLER 1998 — Lifting Operations and Lifting Equipment Regulations (UK)
- ASME B30.5 — Mobile and Locomotive Cranes
- LEEA COPSULE — Code of Practice for the Safe Use of Lifting Equipment
- Crane manufacturer load chart (referenced Section 04/05)

This document is a SAMPLE lift plan produced for demonstration purposes only. It does not constitute an approved lift plan for any live lifting operation. Actual JMR Lifting Solutions project deliverables include site-specific surveys, certified equipment schedules, and a signed authorization prior to any lift.