

Customer Substation Checklist

To be used in conjunction with C&I Manual – Not a Substitute

Project		Project	
Planner		Name and Location	
Date	/ /	Consultant	

Certifications and/or other requirement checklist

N/A	Yes	No	
			Supply confirmation proposed substation floor 75mm above Interim Residential Flood Level (IRFL)
			Fire detection and protection system installed and certified before substation energisation
			Supply single line diagram of consumers mains and main switch board
			Supply mechanical ventilation design with certification
			Supply detail of permanent lifting equipment with certification
			Supply easement documentation
			Supply substation drainage details – Oil separation tank and/or discharge pump and compliance with the EPA
			Note to Provide Certificate of Classification for substation enclosure from Applicant's Building Certifier upon practical completion

Energex cannot progress this project to design or construction until all the applicable requirements above have been fulfilled.

Substation Drawing Checklist

1 – General Drawing Requirements

N/A	Yes	No	
			Substation (Switchgear) located at ground level, one level below ground or one level above ground
			No other services to pass through or under (if directly on ground) substation site
			Substation room/enclosure detail to include 1:50 plan view plus short and long section views
			Show all Energex Equipment – Transformers, 11kV and LV switchgear, battery charger, pilot isolation cubicles, fibre optic panels, interface panels and remote earthing
			Include drawings of relevant Energex Standards eg. Floor anchor, earth pockets, conduit X-sections
			Include an overall site drawing showing location of substation within the development
			Detail access route for Energex equipment, personnel and all Energex cables
			Provision of 24 hour personnel unrestricted (Energex dedicated) emergency access from street to substation
			Include full details of external works to be done by builder eg. footpath conduits, cable jointing pit
			Energex will not agree to EMF shielding being installed inside the substation. Provision must be made for this to be installed outside the substation room
			Note on drawing – Consultant primary contact details as first point of call for construction queries
			Note on drawing – Substation to be inspected and handed to Energex 12 weeks prior to Date Supply Required

Customer Substation Checklist



2 – Access

N/A	Yes	No	
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2.1 General

Equipment

			Confirmation on drawing of 25 tonne load capacity along equipment access route
			3000mm minimum width along straight equipment access route
			Turning radius along access route:- Minimum turning radii – 4900 inside, 7400 outside with 9000 minimum outside radius for equipment clearance
			Vehicle headroom no less than 5.5m (slope not exceeding 1:8)
			2500mm ² loading slab (slope not exceeding 1:20 includes in all manual handling areas)
			Minimum clear opening of 2500mm (2100mm for oil transformers) x 3100mm (indoor)
			Doors swing outwards to 180 degrees
			All floor anchors shown
			Cable pulling eyes shown
			Bollard shown if required
			Permanent lifting equipment shown. Certification supplied to Energex

Hatch

			Minimum size 2500mm x 3000mm
			600mm clearance zone around hatch opening (above and below)
			Retractable or swinging safety guard
			Retractable or swinging weatherproof and self draining tray (for hatch inside substation room only)
			Harness anchoring points as per Energex BMS 01605
			Clearance above hatch – 5300mm using crane OR 4300mm using non retractable beam with double hoist

Personnel

			Detail arrangement of unrestricted access without notice – 24 hours 7 days a week
			Doors swing outwards

2.2 Outdoor Substations

Personnel

			Minimum clear opening of 1200mm
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2.3 Indoor Substations

Equipment

			One door leaf secured with standing bolt (top and bottom), the other door leaf fitted with Lockwood 570 series or similar
			Door operated by key from outside and Lockwood lever handle on inside
			Each door fitted with D handles on both sides. Vermin proof mesh fitted to rear of louvers
			Doors with louvers as Drawing 7874-A4 (external doors only – internal doors 2 hour fire rated timber)

Personnel

			Two separate personnel access doorways (or one personnel plus a suitable equipment access door)
			Minimum clear opening of 800mm x 2000mm
			Fitting of Panic bars or large levers on designated personnel doors

Customer Substation Checklist



3 – Substation Room / Enclosure Clearances – 1.6

N/A	Yes	No	
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Outdoor

			Clearances 900mm between equipment and walls and other obstructions 1500mm in front of operating equipment
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Indoor

			Ceiling height; Bottom entry – 3200mm, Top entry – 3750mm
			Clearances 900mm between equipment and walls and other obstructions OR 1200mm for top entry 1500mm in front of the HV and LV side of dry transformers (ie along the 2300 length) 1500mm in front of operating equipment – HV and LV Sw Gr, pilot isolation cubicle, Battery Charger 1500mm between pilot isolation cubicle and earthed metal

4 – Construction

N/A	Yes	No	
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4.1 General

			Drained cavity wall (for external walls below ground)
			All block walls concrete filled (indoor substations)
			Chamber isolated from remainder of building with a 2 hour fire rating
			Construction prevents the entry of vermin and birds

4.2 References to Painting

			Walls – Light straw and Ceiling – Gross white
			Steel work – Non galvanised metal (primed and grey paint)
			Doors – Neutral (aluminium to be finished with clear anodising and clear lacquer)
			Floors – Sealed for Dry Type transformers

4.3 Trench

			Minimum 1200 deep 900 wide
			Suspended slab over trench for transformer (width:- 1500mm for oil transformers OR 1100mm for dry transformers)
			Trench junctions and corners below slab – 300mm radius undercut with <u>rounded edges</u>
			Trench covers and rebates (plywood – indoor or galvanised steel – outdoor)
			Specifically cut one piece covers for trench 'T's and 'L's – level with bottom of trench cover rebate
			Suitably drained complying with local council requirements and EPA regulations

Customer Substation Checklist



5 – Conduits and Cable			
N/A	Yes	No	
5.1 Conduits			
			Show applicable drawing standards
			Reference to minimum radius bends of 1830mm
			Include conduit cross-section drawings (for inside development and for footpath)
			Draw rope reference
			Entries to be bell mouthed
			Conduits / cable ducts sealed to prevent ingress of water before and after installation of cables 7882-A4
			2 hour fire rating encased
5.2 Cable Stand			
			Show applicable drawing standards
			Low voltage stand Energex specifications
			Flexible braids connectors supplied
			Low voltage cable guard to Energex specifications
5.3 Cable Risers			
			Minimum width 900mm and depth, Minimum 300mm and Maximum 450mm
			Unimpeded access – 1500mm clear area in front of riser door
			Full width and height doors on each level of building
			Unistrut or similar fixed at a minimum vertical spacings of 1000mm
			False ceiling to be removable and area above to be kept clear of services
			2 hour fire rated
			2 cabling pulling eyes at top of riser and where required along internal cable route
5.4 Cable Tray / Ladder / T-Brackets inside substation room			
			Show applicable drawing standards
			Supported along the <u>centre line only</u> or cantilevered off wall
			Brackets at 600mm spacing, between centres (Ladder between 1000mm and 1500mm)
			Cable support brackets braced to end walls
			Not to install comms cable tray after hand over of sub room and after discussion Energex supervisor
5.5 Internal cable route between substation and remote transformers			
			300mm minimum clearance between ladder / tray and underside of supporting slab or services
			Placed under all other services
			2 hour fire rating encased

Customer Substation Checklist



6 – Earthing

N/A	Yes	No	
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6.1 Pockets

			Show applicable drawing standards
			Chase between pockets for outdoor stations
			Chase across doorway only for indoor stations
			Customer to provide their own local Earthing arrangements (not to be connected to Energex Substation earth)

6.2 Remote Earth Grid

			Show applicable drawing standards
			Clear of obstacles and building lightning protection system
			Two separate earth riser conduits
			(63)mm encased structurally or outer steel pipe or HAT section for surface mounted
			Earth riser and test pockets formed with removable covers fitted with Energex identification
			Earth ring cable identification plates imbedded in concrete

7 – Substation Light and Power

N/A	Yes	No	
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			Plan of lighting layout and location of power outlets
			Switchboard – supplied from Essential Supply section of Main Switchboard
			Fluorescent light fittings – Not above plant
			Micro switch to personnel door or stairwell to activate light
			Light switches (heavy duty) adjacent to personnel doors
			Minimum of two GPO's plus and battery charger supply (to be hard wired via junction box or isolator)
			Fan control switch ON, OFF, AUTO (thermostat set point 28°C)

8 – Ventilation

N/A	Yes	No	
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			Certification by practising mechanical engineer
			Clearances 900mm to any equipment
			Duct 100mm from floor
			Fire Dampers
			At least one fan or additional fan to be permanently operational to maintain positive pressure
			Fan control switch ON, OFF, AUTO (thermostat set point 28°C)
			Ventilation outlet at top of room on opposite side to fan with vermin proof mesh fitted

Customer Substation Checklist



9 – External Works by Developer

N/A	Yes	No	
Conduits / Cable pit			
			Show applicable drawing standards
			Footpath conduits – quantity, size and configuration
			Note to inspect conduit installation before backfilling
			Intake cable pit type and pit dimensions
			Cable bell into development

Comments