Alpha
Engineering Consultant

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Our Ref: OM-SC/036

27 December 2004

MEMORANDUM

To: All Staff

From: Andrew Loh

REVISION TO MASTER SPECIFICATIONS FOR ELECTRICAL INSTALLATION

Please note that Schedule 4 – Schedule of Rates for Electrical Installation (NSC & DSC) have been updated. The revised items are highlighted in yellow.

Andrew Loh

cc TLS/RT
cc Memo File

enc

/na

BCA
ISO 9000
CERT. NO.: 236
SS ISO 9001 : 2000

FEEDBACK REPORT FORM

Alpha Engineering Consultant

Ref No:

To: RT From: LFY

Job No./Project: Master Specifications - Schedule of Unit Rate (where applicable)

Source of feedback:

Scope of Feedback: *~~Quality System/Administrative/Contractual/Technical~~/Specification/~~Others~~

Section A : Problem & Cause

See attached.

Section B : Suggested Corrective Action

Section C: Approved Corrective Action

Approved By : [signature] Date: 8/12/2004.

Section D : Action

Action By: NA [signature]

Targeted Completion: Dec '04

Actual Completion: 10/12/04 Verified By: [signature] TWC

* *Delete as appropriate*

Distribution:

ELECTRICAL INSTALLATION

SCHEDULE 4 - SCHEDULE OF RATES

10/12/04

Preamble

The prices in S$ as entered in the Schedule of Rates for the various works as detailed hereinafter will be used for any variation which may constitute adjustment (addition or subtraction) to the Sub-Contract Sum.

The rates quoted shall be for the 'Supply and Fixing' and shall cover all works to comply fully with the Sub-Contact (i.e. specifications, drawings, Conditions of Sub-Contract, etc.) and shall include all costs for incidental work, e.g. administration, project supervision, design, etc. and profits. The rates quoted shall be deemed to cover all associated items necessary for the completeness of the works inclusive of any wastage, etc.

(a) Prices for MCCBs, MCBs, RCCBs and Contactors shall include all connections, additional casing space, etc

(b) Prices for cables shall include also conduit, trunking or tray, where appropriate, cable boxes, glands, lugs, earth wire, jointings and connections, etc.

(c) Prices for lighting points shall include terminations, ceiling roses, etc.

(d) Prices for switches, switched socket outlets, TV and TV/FM outlets, telephone, data outlets and connection units shall include knock-out boxes, earth wires and fixing screws, etc

(e) Prices for earth pits shall include securing the earth pits at the final level.

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HV Switchgear

Code No.	Description	Unit Rate (S$)
E1001	1 no. 22kV receiving panel as specified excluding all external electrical connections only	
E1002	1 no. 22kV bus coupler as specified	
E1003	1 no. 22kV transformer panel as specified excluding all external electrical connections only	

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Power Transformers - Dry Type

1 no. 22/0.4 kV Type '**AN**' transformer as specified excluding all external electrical connections of the following capacity:-		
Code No.	Description	Unit Rate (S$)
E1101	2000 kVA	
E1102	1600 kVA	
E1103	1250 kVA	
E1104	1000 kVA	
E1105	800 kVA	
E1106	630 kVA	

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Power Transformers - Dry Type

1 no. 22/0.4 kV Type '**AN/AF**' transformer as specified excluding all external electrical connections of the following capacity:-		
Code No.	Description	Unit Rate (S$)
E1121	2000 kVA	
E1122	1600 kVA	
E1123	1250 kVA	
E1124	1000 kVA	
E1125	800 kVA	
E1126	630 kVA	

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Power Transformers

1 no. 22/0.4 kV Type '**KNAN**' transformer as specified excluding all external electrical connections of the following capacity:-		
Code No.	Description	Unit Rate (S$)
E1161	2000 kVA	
E1162	1600 kVA	
E1163	1250 kVA	
E1164	1000 kVA	
E1165	800 kVA	
E1166	630 kVA	

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HV Cabling

Code No.	Description	Unit Rate (S$)
E1201	1 x 300 sq mm 3 core double steel wire armoured 22kV XLPE cable run on horizontal/vertical cable ladder and/or framing system as specified - **per metre run**	
E1202	1 x 300 sq mm 3 core single steel wire armoured 22kV XLPE cable run on horizontal/vertical cable ladder and/or framing system as specified - **per metre run**	
E1203	1 x 185 sq mm 3 core double steel wire armoured 22kV XLPE cable run on horizontal/vertical cable ladder and/or framing system as specified - **per metre run**	
E1204	1 x 185 sq mm 3 core single steel wire armoured 22kV XLPE cable run on horizontal/vertical cable ladder and/or framing system as specified - **per metre run**	

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LV Cabling - FR Cables

450/750 volt grade **FR** cables on vertical/horizontal cable tray/cable ladder or in GI conduit/trunking run on surface inclusive of supporting brackets, tray/ladder fixing cleats, cable lugs, terminations, jointings, and accessories, earth wire, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E1601	8 x 400 mm^2/1C	
E1602	8 x 185 mm^2/1C	
E1603	4 x 500 mm^2/1C	
E1604	4 x 400 mm^2/1C	
E1605	4 x 300 mm^2/1C	
E1606	4 x 240 mm^2/1C	
E1607	4 x 185 mm^2/1C	
E1608	4 x 150 mm^2/1C	
E1609	4 x 120 mm^2/1C	
E1610	4 x 95 mm^2/1C	
E1611	4 x 70 mm^2/1C	
E1612	4 x 50 mm^2/1C	
E1613	4 x 35 mm^2/1C	
E1614	4 x 25 mm^2/1C	
E1615	4 x 16 mm^2/1C	
E1616	4 x 10 mm^2/1C	
E1617	4 x 6 mm^2/1C	
E1618	4 x 4 mm^2/1C	
E1619	4 x 2.5 mm^2/1C	
E1620	2 x 25 mm^2/1C	
E1621	2 x 16 mm^2/1C	
E1622	2 x 10 mm^2/1C	
E1623	2 x 6 mm^2/1C	
E1624	2 x 4 mm^2/1C	

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LV Cabling - FR Cables

450/750 volt grade **FR** cables in GI conduit run concealed in floor slabs, columns, beams or walls inclusive of conduit fittings, earth wire termination, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E1701	4 x 25 mm^2/1C	
E1702	4 x 16 mm^2/1C	
E1703	4 x 10 mm^2/1C	
E1704	4 x 6 mm^2/1C	
E1705	4 x 4 mm^2/1C	
E1706	4 x 2.5 mm^2/1C	
E1707	2 x 25 mm^2/1C	
E1708	2 x 16 mm^2/1C	
E1709	2 x 10 mm^2/1C	
E1710	2 x 6 mm^2/1C	
E1711	2 x 4 mm^2/1C	

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LV Cabling - PVC/PVC Cables

450/750 volt grade **PVC/PVC** cables on vertical/horizontal cable ladder inclusive of ladder, accessories, earth wire, terminations, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E1801	8 x 500 mm^2/1C	
E1802	8 x 400 mm^2/1C	
E1803	8 x 240 mm^2/1C	
E1804	8 x 185 mm^2/1C	
E1805	4 x 400 mm^2/1C	
E1806	4 x 240 mm^2/1C	
E1807	4 x 185 mm^2/1C	
E1808	4 x 150 mm^2/1C	
E1809	4 x 120 mm^2/1C	
E1810	4 x 95 mm^2/1C	
E1811	4 x 70 mm^2/1C	
E1812	4 x 50 mm^2/1C	

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LV Cabling - XLPE/PVC Cables

450/750 volt grade **XLPE/PVC** cables on vertical/horizontal cable ladder inclusive of ladder, accessories, earth wire, terminations, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E1901	12 x 500 mm^2/1C	
E1902	8 x 630 mm^2/1C	
E1903	8 x 500 mm^2/1C	
E1904	8 x 400 mm^2/1C	
E1905	8 x 300 mm^2/1C	
E1906	8 x 185 mm^2/1C	
E1907	4 x 400 mm^2/1C	
E1908	4 x 240 mm^2/1C	
E1909	4 x 185 mm^2/1C	
E1910	4 x 150 mm^2/1C	
E1911	4 x 120 mm^2/1C	
E1912	4 x 95 mm^2/1C	
E1913	4 x 70 mm^2/1C	
E1914	4 x 50 mm^2/1C	

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LV Cabling - XLPE/SWA/PVC

600/1000 volt grade **XLPE/SWA/PVC** cables laid underground inclusive of cable lugs, cable cover, markers, terminations, joints and accessories, including preparation of sand bedding and backfilling up to two layers as specified of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2001	1 x 300 mm^2/4C (copper conductor)	
E2002	1 x 240 mm^2/4C (copper conductor)	
E2003	1 x 300 mm^2/4C (aluminium conductor)	
E2004	1 x 240 mm^2/4C (aluminium conductor)	

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LV Cabling - PVC Cables (surface)

450/750 volt grade **PVC** cables in GI conduit/trunking run on **surface** inclusive of conduit/trunking, accessories, earth wire, terminations, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2101	4 x 120 mm^2/1C	
E2102	4 x 95 mm^2/1C	
E2103	4 x 70 mm^2/1C	
E2104	4 x 50 mm^2/1C	
E2105	4 x 35 mm^2/1C	
E2106	4 x 25 mm^2/1C	
E2107	4 x 16 mm^2/1C	
E2108	4 x 10 mm^2/1C	
E2109	4 x 6 mm^2/1C	
E2110	4 x 4 mm^2/1C	
E2111	4 x 2.5 mm^2/1C	
E2112	2 x 25 mm^2/1C	
E2113	2 x 16 mm^2/1C	
E2114	2 x 10 mm^2/1C	
E2115	2 x 6 mm^2/1C	
E2116	2 x 4 mm^2/1C	
E2117	1 x 25 mm^2/4C	
E2118	1 x 16 mm^2/4C	
E2119	1 x 10 mm^2/4C	
E2120	1 x 6 mm^2/4C	
E2121	1 x 4 mm^2/4C	
E2122	1 x 2.5 mm^2/4C	
E2123	1 x 25 mm^2/2C	
E2124	1 x 16 mm^2/2C	
E2125	1 x 10 mm^2/2C	
E2126	1 x 6 mm^2/2C	
E2127	1 x 4 mm^2/2C	

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LV Cabling - PVC Cables (concealed)

450/750 volt grade **PVC** cables in UPVC conduit run **concealed** in floor slabs, columns, beams or walls inclusive of conduit fittings, earth wire termination, etc. of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2201	4 x 25 mm^2/1C	
E2202	4 x 16 mm^2/1C	
E2203	4 x 10 mm^2/1C	
E2204	4 x 6 mm^2/1C	
E2205	4 x 4 mm^2/1C	
E2206	4 x 2.5 mm^2/1C	
E2207	2 x 25 mm^2/1C	
E2208	2 x 16 mm^2/1C	
E2209	2 x 10 mm^2/1C	
E2210	2 x 6 mm^2/1C	
E2211	2 x 4 mm^2/1C	
E2212	1 x 6 mm^2/4C	
E2213	1 x 4 mm^2/4C	
E2214	1 x 2.5 mm^2/4C	
E2215	1 x 6 mm^2/2C	
E2216	1 x 4 mm^2/2C	
E2217	1 x 2.5 mm^2/2C	

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LV Cabling - PVC/SWA/PVC

450/750 volt grade **PVC/SWA/PVC** cables run on underground inclusive of cable lugs, cable cover, markers, terminations, joints, accessories, including preparation of sand bedding & backfilling up to two layers as specified of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2311	1 x 16 mm^2/4C	
E2312	1 x 10 mm^2/4C	
E2313	1 x 4 mm^2/4C	
E2314	1 x 2.5 mm^2/4C	
E2315	1 x 16 mm^2/2C	
E2316	1 x 10 mm^2/2C	
E2317	1 x 4 mm^2/2C	
E2318	1 x 2.5 mm^2/2C	

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LV Cabling - UPVC Pipes

Heavy duty **UPVC** pipe buried underground including excavation, concrete encasement, reinstatement, etc. as specified of the following size, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2351	2 nos. 150 diameter	
E2352	1 no. 150 diameter	
E2353	2 nos. 100 diameter	
E2354	1 no. 100 diameter	

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LV Cabling - Final Circuits (Lighting)

Wiring to 1 no. ceiling/wall **lighting point** using the following type & size of cables in **surface/ concealed G.I.** conduit/trunking inclusive of earth wire, conduit/trunking & fittings, terminations, ceiling rose etc. (excluding switch):

Code No.	Description	Unit Rate (S$)
E2401	2 x 1.5 mm^2/1C PVC	
E2402	2 x 2.5 mm^2/1C PVC	
E2403	2 x 2.5 mm^2/1C FR	
E2404	2 x 2.5 mm^2/1C FR together with a 1 x 1.5mm^2/1C PVC unswitched cable for maintained emergency light (excluding emergency light)	

Wiring to 1 no. ceiling/wall **lighting point** using the following type & size of cables in **concealed UPVC** conduit inclusive of earth wire, conduit/trunking & fittings, terminations, ceiling rose etc. (excluding switch):

Code No.	Description	Unit Rate (S$)
E2410	2 x 1.5 mm^2/1C PVC	
E2411	2 x 2.5 mm^2/1C PVC	
E2412	2 x 2.5 mm^2/1C FR	
E2413	2 x 2.5 mm^2/1C FR together with a 1 x 1.5mm^2/1C PVC unswitched cable for maintained emergency light (excluding emergency light)	

Wiring from a cable transition/junction box to **1 no. outdoor** lighting point using PVC/SWA/PVC armoured cables of the following size run underground of excavation, cable cover, markers, reinstatement, terminations, etc. as specified (excluding transition/junction box):

Code No.	Description	Unit Rate (S$)
E2451	1 x 2.5 mm^2/2C	
E2452	1 x 4 mm^2/2C	

Wiring from distribution board to cable transition/junction box (for subsequent running of armoured cables) using the following cable sizes run in concealed/ surface UPVC/GI conduits or trunkings including terminations, cable transition/ junction box, etc.

Code No.	Description	Unit Rate (S$)
E2445	2 x 2.5 mm^2/1C	
E2446	2 x 4 mm^2/1C	

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LV Cabling - Final Circuits (Power)

Wiring to 1 no. **wall/column mounted power point** (ring or radial circuit) for the following type/ rating of switched socket outlets (SSO) & type/size of cables in **surface/concealed G.I.** conduit/ trunking inclusive of earth wire, conduit/trunking & fittings, terminations, etc. (excluding switch socket outlet):

Code No.	Description	Unit Rate (S$)
E2501	13A single SSO using 2 x 2.5mm^2/1C PVC cable	
E2502	13A twin SSO using 2 x 2.5mm^2/1C PVC cable	
E2503	13A single SSO using 2 x 2.5mm^2/1C FR cable	
E2504	13A twin SSO using 2 x 2.5mm^2/1C FR cable	
E2505	15A SSO using 2 x 2.5mm^2/1C PVC cable	
E2506	15A SSO using 2 x 2.5mm^2/1C FR cable	

Wiring to 1 no. **wall/column mounted power point** (ring or radial circuit) for the following type/ ting of switched socket outlets (SSO) & type/size of cables in **concealed UPVC** conduit inclusive of earth wire, conduit/trunking & fittings, terminations, etc. (excluding switch socket outlet):

Code No.	Description	Unit Rate (S$)
E2510	13A single SSO using 2 x 2.5mm^2/1C PVC cable	
E2511	13A twin SSO using 2 x 2.5mm^2/1C PVC cable	
E2512	13A single SSO using 2 x 2.5mm^2/1C FR cable	
E2513	13A twin SSO using 2 x 2.5mm^2/1C FR cable	
E2514	15A SSO using 2 x 2.5mm^2/1C PVC cable	
E2515	15A SSO using 2 x 2.5mm^2/1C FR cable	

Wiring to 1 no. floor **pedestal mounted power point** (ring or radial circuit) for the following type/rating of switched socket outlets (SSO) using 2 x 2.5mm^2/1C PVC cables via the flushfloor or underfloor trunking system inclusive of earth wire, fixings, terminations, etc. (excluding flushfloor or underfloor trunking, pedestal and switch socket outlet):

Code No.	Description	Unit Rate (S$)
E2551	13A single SSO	
E2552	13A twin SSO	
E2553	15A single SSO	

Code No.	Description	Unit Rate (S$)
E2561	Installation of 1 no. floor pedestal (single or twin) outlet to the flushfloor trunking system inclusive of drilling, fixing, etc. (excluding pedestal, flushfloor trunking & fixing accessories)	

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LV Cabling - Final Circuits (Miscellaneous)

Code No.	Description	Unit Rate (S$)
E2571	Wiring to 1 no. dc door chime including bell push wiring using 2 x 1.5mm^2/1C PVC cables in **surface/concealed G.I.** conduit, inclusive of earth wire, conduit fittings, terminations, etc. (excluding chime & bell push)	
E2572	Wiring to 1 no. wall mounted 20A water heater switch and 20A water heater connector using 2 x 4mm^2/1C PVC cables in **concealed/surface G.I.** conduit inclusive of earth wire, terminations, etc. (excluding water heater switch & connector unit)	
E2573	Wiring to 1 no. wall mounted cooker control switch and cooker connector unit using 2 x 4 mm^2/1C PVC cables in **surface/concealed G.I.** conduit inclusive of earth wire, terminations, etc. (excluding cooker control switch & cooker connector unit)	
E2574	Wiring to 1 no. wall mounted cooker control switch and cooker connector unit using 2 x 6mm^2/1C PVC cables in **surface/concealed G.I.** conduit inclusive of earth wire, terminations, etc. (excluding cooker control switch & cooker connector unit)	

Wiring to 1 no. 13A fused connection unit using the following type & size of cable in **surface/ concealed G.I.** conduit/trunking inclusive of earth wire, conduit/trunking & fittings, terminations, etc. (excluding switch & fused connection unit):

Code No.	Description	Unit Rate (S$)
E2575	2 x 2.5mm^2/1C PVC	
E2576	2 x 2.5mm^2/1C FR	

Code No.	Description	Unit Rate (S$)
E2577	Wiring to 1 no. dc door chime including bell push wiring using 2 x 1.5mm^2/1C PVC cables in **concealed UPVC** conduit, inclusive of earth wire, conduit fittings, terminations, etc. (excluding chime & bell push)	
E2578	Wiring to 1 no. wall mounted 20A water heater switch and 20A water heater connector using 2 x 4mm^2/1C PVC cables in **concealed UPVC** conduit inclusive of earth wire, terminations, etc. (excluding water heater switch & connector unit)	
E2579	Wiring to 1 no. wall mounted cooker control switch and cooker connector unit using 2 x 4 mm^2/1C PVC cables in **concealed UPVC** conduit inclusive of earth wire, terminations, etc. (excluding cooker control switch & cooker connector unit)	
E2580	Wiring to 1 no. wall mounted cooker control switch and cooker connector unit using 2 x 6mm^2/1C PVC cables in **concealed UPVC** conduit inclusive of earth wire, terminations, etc. (excluding cooker control switch & cooker connector unit)	

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Wiring to 1 no. 13A fused connection unit using the following type & size of cable in **concealed UPVC** conduit inclusive of earth wire, conduit & fittings, terminations, etc. (excluding switch & fused connection unit):		
Code No.	Description	Unit Rate (S$)
E2581	2 x 2.5mm^2/1C PVC	
E2582	2 x 2.5mm^2/1C FR	

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Busbar Trunking - Feeder

Feeder busbar trunking inclusive of supporting brackets, fixings, fire barriers, expansion joints, termination unit, earth conductor, connections, etc. of the following rating, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2601	4000 A 4-Pole	
E2602	3000 A 4-Pole	
E2603	2500 A 4-Pole	
E2604	2000 A 4-Pole	
E2605	1600 A 4-Pole	
E2606	1000 A 4-Pole	

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Busbar Trunking - Vertical

Vertical busbar trunking (rising mains) inclusive of supporting brackets, fixings, fire barriers, expansion joints, trust block, tap-off parts, feed-in unit, earth conductor connections, etc. of the following rating, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2651	1600 A 4-Pole	
E2652	1200 A 4-Pole	
E2653	1000 A 4-Pole	
E2654	700 A 4-Pole	
E2655	600 A 4-Pole	
E2656	400 A 4-Pole	

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Busbar Trunking - Horizontal

Horizontal busbar trunking (sub-mains) inclusive of supporting brackets, fixings, fire barriers, expansion joints, tap-off parts, feed-in unit, earth conductor connections, etc. of the following rating, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E2701	500 A TPN	
E2702	400 A TPN	
E2703	300 A TPN	
E2704	200 A TPN	

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Busbar Trunking - Tap-Offs

Plug-in tap-off units inclusive of HRC fuses, etc. of the following rating, per unit:		
Code No.	Description	Unit Rate (S$)
E2751	500 A TPN	
E2752	400 A TPN	
E2753	300 A TPN	
E2754	200 A TPN	
E2755	150 A TPN	
E2756	100 A TPN	
E2757	60 A TPN	
E2758	40 A TPN	
E2759	30 A TPN	
E2760	20 A TPN	
E2761	60 A SPN	
E2762	30 A SPN	

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Distribution Boards

Distribution Boards as specified complete with incoming TPN, DP or SPN, MCB/RCCB, busbar, outgoing TP, DP or SP MCCBs/MCBs, contactors, connections, labels, etc. per unit:		
Code No.	Description	Unit Rate (S$)
E3001		
E3002		
E3003		
E3004		
E3005		
E3006		
E3007		
E3008		
E3009		
E3010		
E3011		
E3012		
E3013		
E3014		

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Metering Panels/Boards

Metering Panels/Boards as specified c/w incoming TPN, DP or SPN MCCB, busbars, outgoing MCCBs/MCBs, HRC fuse cut-out unit, connections, labels, etc. per unit:		
Code No.	Description	Unit Rate (S$)
E3101		
E3102		
E3103		
E3104		
E3105		

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Cable Termination Boxes

Code No.	Description	Unit Rate (S$)
E3201	1 no. cable termination box as specified including 4 nos. HRC fuses and 3 nos. four way branching connectors.	

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Automatic Transfer Switches

1 no. 4-Pole automatic transfer switch as specified of the following rating, per unit:		
Code No.	Description	Unit Rate (S$)
E3251	2000 A	
E3252	1600 A	
E3253	1400 A	
E3254	1200 A	
E3255	1000 A	
E3256	800 A	
E3257	700 A	
E3258	600 A	
E3259	500 A	
E3260	400 A	
E3261	300 A	
E3262	250 A	

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MCCBs in Main Switchboard

Supply and installation of 1 no. outgoing or incoming MCCB in any main switchboard board inclusive of all connections, additional casing space, etc.		
Code No.	Description	Unit Rate (S$)
E3301	1200A TP, 50 kA	
E3302	1000A TP, 50 kA	
E3303	800A TP, 50 kA	
E3304	630A TP, 50 kA	
E3305	400A TP, 50 kA	
E3306	400A TP, 36 kA	
E3307	250A TP, 36 kA	
E3308	200A TP, 36 kA	
E3309	160A TP, 36 kA	
E3310	100A TP, 36kA	

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MCBs

Supply and installation of 1 no. outgoing or incoming MCB of Type 'B' or Type 'C' tripping characteristic in any distribution board inclusive of all connections, additional casing space etc.		
Code No.	Description	Unit Rate (S$)
E3401	100A TP, 15 kA	
E3402	63A TP, 15 kA	
E3403	40A TP, 15 kA	
E3404	32A TP, 15 kA	
E3405	20A TP, 15kA	
E3406	10A TP, 15kA	
E3407	63A TP, 10 kA	
E3408	40A TP, 10 kA	
E3409	32A TP, 10 kA	
E3410	20A TP, 10 kA	
E3411	15A TP, 10 kA	
E3412	10A TP, 10 kA	
E3413	63A SP, 15 kA	
E3414	40A SP, 15 kA	
E3415	32A SP, 15 kA	
E3416	20A SP, 15 kA	
E3417	15A SP, 15 kA	
E3418	63A SP, 10 kA	
E3419	40A SP, 10 kA	
E3420	32A SP, 10 kA	
E3421	20A SP, 10 kA	
E3422	15A SP, 10 kA	
E3423	20A SP, 6 kA	
E3424	15A SP, 6 kA	
E3425	10A SP, 6 kA	

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RCCBs

Supply and installation of 1 no. RCCB in any distribution board inclusive of all connections, additional casing space, etc. of the following rating & sensitivity:		
Code No.	Description	Unit Rate (S$)
E3501	100A 4 Pole (100mA)	
E3502	63A 4 Pole (100mA)	
E3503	40A 4 Pole (100mA)	
E3504	63A 4 Pole (30mA)	
E3505	40A 4 Pole (30mA)	
E3506	63A 2 Pole (30mA)	
E3507	40A 2 Pole (30mA)	

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Contactors

Supply and installation of 1 no. 25 A contactor to the outgoing circuits of any distribution board inclusive of auxiliary contacts, fuse, connection, internal wiring, etc. with the following no. of poles:		
Code No.	Description	Unit Rate (S$)
E3521	1 Pole	
E3522	2 Pole	
E3523	3 Pole	
E3524	4 Pole	

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Wiring accessories, isolating switches etc.

1 no. flush mounted grid switch of white bakelite finish c/w accessories, etc.:-		
Code No.	Description	Unit Rate (S$)
E3601	10 A, 1 gang, 1 way	
E3602	10 A, 2 gang, 1 way	
E3603	10 A, 3 gang, 1 way	
E3604	10 A, 4 gang, 1 way	
E3605	10 A, 5 gang, 1 way	
E3606	10 A, 6 gang, 1 way	
E3607	10 A, 8 gang, 1 way	
E3608	20 A, 1 gang, 1 way	
E3609	20 A, 2 gang, 1 way	
E3610	20 A, double pole, 1 way	

1 no. surface mounted metal-clad switch c/w accessories, etc:		
Code No.	Description	Unit Rate (S$)
E3621	10 A, 1 gang, 1 way	
E3622	10 A, 2 gang, 1 way	
E3623	10 A, 3 gang, 1 way	
E3624	10 A, 4 gang, 1 way	
E3625	10 A, 5 gang, 1 way	
E3626	10 A, 6 gang, 1 way	
E3627	10 A, 8 gang, 1 way	
E3628	20 A, 1 gang, 1 way	
E3629	20 A, 2 gang, 1 way	
E3630	20 A, double pole, 1 way	

1 no. totally enclosed/weatherproof (IP 56) polycarbonate switch c/w accessories, etc:-		
Code No.	Description	Unit Rate (S$)
E3631	10 A, 1 gang, 1 way	
E3632	10 A, 2 gang, 1 way	
E3633	20 A, 1 gang, 1 way	
E3634	20 A, 2 gang, 1 way	

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1 no. flush mounted single phase switch socket outlet of white bakelite finish c/w accessories, etc:		
Code No.	Description	Unit Rate (S$)
E3651	Single 13 A	
E3652	Twin 13 A	
E3653	Single 15 A	
E3661	1 no. flush mounted 13A fused connection unit of white bakelite finish c/w fuse, accessories, etc.	
E3662	1 no. surface mounted metalclad 13A fused connection unit c/w fuse, accessories, etc.	

1 no. surface mounted metal-clad single phase switch socket outlet c/w accessories, etc:		
Code No.	Description	Unit Rate (S$)
E3671	Single 13 A	
E3672	Twin 13 A	
E3673	Single 15 A	

1 no. weatherproof (IP 56) surface mounted polycarbonate single phase switch socket outlet c/w accessories, plug top, etc. for installation on wall/column/partition		
Code No.	Description	Unit Rate (S$)
E3681	Single 13 A	
E3682	Twin 13 A	
E3683	Single 16 A	

1 no. polycarbonate isolating switch c/w accessories, etc of the following current rating:		
Code No.	Description	Unit Rate (S$)
E3691	100 A TPN	
E3692	60 A TPN	
E3693	30 A TPN	
E3694	20 A TPN	
E3695	15 A TPN	
E3696	30 A SPN	
E3697	20 A SPN	
E3698	15 A SPN	

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Code No.	Description	Unit Rate (S$)
E3700	1 no. 30A cooker unit as specified	
E3710	1 no. 30A cooker connector unit as specified	
E3720	1 no. 20A DP water heater switch as specified	
E3730	1 no. 20A water heater connector unit as specified	
E3740	1 no. dc. door chime as specified c/w fixing etc. excluding external wiring	
E3750	1 no. door bell push switch as specified excluding all external wiring	
E3751	1 no IP 55 clear plastic hinged cover for 13A switched socket outlet	

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Ceiling Fans

Code No.	Description	Unit Rate (S$)
E3771	1 no. ceiling fan as specified inclusive of suspension rod, fixings, terminations, etc. (excluding wiring)	
E3772	1 no. fan speed regulator (excluding wiring)	
E3773	Wiring to 1 no. ceiling fan and regulator using 2 x 2.5mm^2/1C PVC cables in surface/concealed G.I. conduit trunking inclusive of earth wire, conduit/trunking & fittings, terminations, etc.	
E3774	1 no. oscillating fan as specified inclusive of fixings, terminations, etc. (excluding wiring)	
E3775	Wiring to 1 no. oscillating fan using 2 x 2.5mm^2/1C PVC cables in surface/concealed G.I. conduit trunking inclusive of earth wire, conduit/trunking & fittings, terminations, etc.	

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Dimming System

Code No.	Description	Unit Rate (S$)
E3781	1 no. 1 kW dimmer unit as specified	
E3782	1 no. 2 kW dimmer unit as specified	
E3783	Wiring from dimmer unit to dimmer control panel, per metre run	

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Underfloor Ducting Installation

Underfloor duct as specified inclusive of connections, terminations, cuttings, solvent welding, plugging, fixings, clips, draw wires, accessories, etc. (excluding wiring within ducts)		
Code No.	Description	Unit Rate (S$)
E3801	1 way duct per metre run	
E3802	2 way duct per metre run	
E3803	3 way duct per metre run	
E3804	1 no. 3 x 3 or 3 x 2 way junction box c/w cover etc.	
E3805	1 no. 2 x 2 way junction box c/w cover etc.	
E3806	1 no. 1 x 1 way junction box c/w cover etc.	
E3807	1 no. 3 way flush vertical access box c/w cover etc.	
E3808	1 no. 3 way surface vertical access box c/w cover etc.	
E3809	1 no. 2 way flush vertical access box c/w cover etc.	
E3810	1 no. 2 way surface vertical access box c/w cover etc.	
E3811	1 no. 20mm or 25mm PVC conduit connected to ducts/junction boxes to pedestals including hacking and making good of floor screed, fixings, etc. (excluding pedestals, junction boxes, & ducts)	

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Luminaires

Supply and installation of 1 no. luminaire c/w all mounting bracket, suspension sets, flexible heat resistant cable, etc.:		
Code No.	Description	Unit Rate (S$)
E4001	Type 'A1'	
E4002	Type 'B1'	
E4003	Type 'B2'	
E4004	Type 'E1'	
E4005	Type 'E2'	
E4006	Type 'E3'	
E4007	Type 'E4'	
E4008	Type 'E5'	
E4009	Type 'E6'	
E4010	Type 'E7'	
E4011	Type 'F1'	
E4012	Type 'F1A'	
E4013	Type 'F2'	
E4014	Type 'F2A'	
E4015	Type 'F3'	
E4016	Type 'F3A'	
E4017	Type 'F4'	
E4018	Type 'F4A'	
E4019	Type 'F5'	
E4020	Type 'F6'	
E4021	Type 'F7'	
E4022	Type 'F8'	
E4023	Type 'F8A'	
E4024	Type 'F9'	
E4025	Type 'F9A'	
E4026	Type 'F10'	
E4027	Type 'F10A'	
E4028	Type 'F11'	

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Luminaires (Cont'd)

Supply and installation of 1 no. lighting fitting c/w all mounting bracket, suspension sets, flexible heat resistant cable, etc.:

Code No.	Description	Unit Rate (S$)
E4029	Type 'F11A'	
E4030	Type 'F12'	
E4031	Type 'F12A'	
E4032	Type 'F13'	
E4033	Type 'F14'	
E4034	Type 'F14A'	

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Installation of Luminaires

Installation of luminaires covered under Provisional Sums, including taking delivery on site, checking on the consignments for defective items including arrangement for replacements by suppliers, storage at site, fixing of lamps, installation and site testing, replacements of lamps/tubes and defective parts/fittings during the Maintenance Period, provision of fixing accessories, mounting brackets, supports, r.c. stumps/bases, heat resistant flexible cords, etc:

Code No.	Description	Unit Rate (S$)
E4101	Recessed downlight luminaires	
E4202	Recessed fluorescent luminaires	
E4103	Surface/wall mounted luminaires	
E4104	Free standing bollards	
E4105	Pole mounted luminaires	
E4106	Cold cathode lamps (including transformers, etc.) per metre run	
E4107	Floodlight luminaires	
E4108	Planter spike mounted luminaires	

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Landscape Lighting

Code No.	Description	Unit Rate (S$)
E4151	1 no. outdoor lighting box c/w connectors for connection to outdoor lighting fitting	
E4152	1 no. O/G box c/w concrete plinth, etc. as specified (excluding distribution board)	

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Telephone Installation - Ladders

Horizontal telephone cable ladder c/w supporting brackets, fixing etc, per metre run:		
Code No.	Description	Unit Rate (S$)
E4201	1000mm	
E4202	800mm	
E4203	600mm	
E4204	450mm	
E4205	300mm	

Vertical telephone cable ladder c/w supporting brackets, fixing, etc. per metre run:		
Code No.	Description	Unit Rate (S$)
E4221	1000mm	
E4222	800mm	
E4223	600mm	
E4224	450mm	
E4225	300mm	

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Telephone Installation - Cable Trays

Horizontal telephone cable tray c/w supporting brackets, fixing etc, per metre run:		
Code No.	Description	Unit Rate (S$)
E4241	300mm	
E4242	200mm	
E4243	150mm	
E4244	100mm	

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Telephone Installation - UPVC Pipes

Heavy duty UPVC pipe buried underground including excavation, concrete encasement, draw wire, plugging end, reinstatement, etc. as specified of the following size, per metre run:		
Code No.	Description	Unit Rate (S$)
E4261	4 nos. 110mm diameter	
E4262	2 nos. 110mm diameter	
E4263	2 nos. 50mm diameter	
E4264	1 no. 50mm diameter	

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Telephone Installation - Conduits

Surface/concealed G.I. conduits in false ceiling/floor slab/wall/column for telephone or other services cables inclusive of bending and cutting where necessary, terminations, fixings, pull/junction box, coupling, outlet box, draw wire etc. (excluding telephone outlet plates & telephone cables), **per metre run**:		
Code No.	Description	Unit Rate (S$)
E4281	50mm dia.	
E4282	32mm dia.	
E4283	25mm dia.	
E4284	20mm dia.	

Concealed UPVC conduits in ceiling/floor slab/wall/column for telephone or other services cables inclusive of bending and cutting where necessary, terminations, fixings, pull/junction box, coupling, outlet box, draw wire etc. (excluding telephone outlet plates & telephone cables), **per metre run**:		
Code No.	Description	Unit Rate (S$)
E4291	50mm dia.	
E4292	32mm dia.	
E4293	25mm dia.	
E4294	20mm dia.	

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Telephone Installation - Distribution Cases

Distribution case/frame including "quick connection" type terminals, fixing, terminations, etc. (excluding external wiring) for:		
Code No.	Description	Unit Rate (S$)
E4301	100 pairs cable	
E4302	30 pairs cable	
E4303	20 pairs cable	
E4304	10 pairs cable	

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Telephone Installation - Manholes

1 no. telephone manhole including excavation, etc. as specified		
Code No.	Description	Unit Rate (S$)
E4321	Type MC1	
E4322	Type MC2	
E4323	Type MC3	
E4324	Type MC4	

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Telephone Installation – Cables (Cat 3)

Cat 3 cables run on trays or conduits inclusive of terminations, etc. (excluding trays & conduits), per metre run:		
Code No.	Description	Unit Rate (S$)
E4331	320 pairs	
E4332	200 pairs	
E4333	160 pairs	
E4334	80 pairs	
E4335	60 pairs	
E4336	40 pairs	
E4337	20 pairs	
E4338	10 pairs	

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Telephone Installation – Cables (Cat 5e)

Cat 5e UTP cables run on trays or conduits inclusive of terminations, etc. (excluding trays & conduits), per metre run:		
Code No.	Description	Unit Rate (S$)
E4341	4 pairs	

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Telephone/Data Installation – Telephone/Data accessories

Code No.	Description	Unit Rate (S$)
E4351	1 no. telephone outlet plate (RJ11) including knockout box, etc.	
E4352	1 no. data outlet plate (RJ45) including knockout box, etc.	
E4353	1 no. terminal block	

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Earthing Installation

Code No.	Description	Unit Rate (S$)
E4401	50mm x 6mm main copper earthing bar c/w insulators, connection studs, etc. as specified per metre run	
E4402	25mm x 3mm copper tape inclusive of jointing, connections, accessories, etc. per metre run	
E4403	150mm^2/1C yellow/green PVC insulated copper conductor cable inclusive of jointing, fixing, connections, etc. per metre run	
E4404	95mm^2/1C yellow/green PVC insulated copper conductor cable inclusive of jointing, fixing, connections, etc. per metre run	
E4405	15mm diameter extensible steel cored copper electrode inclusive of coupling, etc. – 1.5 metre length	
E4406	1 no. earthing pit (excluding earth rods)	
E4407	1 no. earthing pit of the double seal electrode type (excluding earth rods)	

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Lightning Protection Installation

Roof conductor inclusive of insulators, jointings connections, accessories, etc. per metre run:		
Code No.	Description	Unit Rate (S$)
E4501	25mm x 3mm copper tape	
E4502	25mm x 3mm aluminium tape	

Down conductor inclusive of jointings, fixings, connections, accessories, etc. per metre run		
Code No.	Description	Unit Rate (S$)
E4503	25mm x 3mm copper tape	
E4504	25mm x 3mm aluminium tape	

Code No.	Description	Unit Rate (S$)
E4505	1 no. earthing pit as specified (excluding earth rods)	
E4506	1 no. earthing pit of the double seal electrode type (excluding earth rods)	

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Voice Communication System - Sound System

Code No.	Description	Unit Rate (S$)
E4601	1 no. 400 watt (r.m.s.) power amplifier excluding rack and external connections	
E4602	1 no. 240 watt (r.m.s.) power amplifier excluding rack and external connections	
E4603	1 no. 120 watt (r.m.s.) power amplifier excluding rack and external connections	
E4604	1 no. pre-amplifier excluding rack and external connections	
E4605	1 no. cassette playback unit excluding rack and external connections	
E4606	1 no. FM/AM radio tuner excluding rack and external connections	
E4607	1 no. recessed ceiling loudspeaker inclusive of matching transformer, enclosure, grille/baffle, mounting brackets, flexible heat resistant cable, etc. as specified	
E4608	1 no. surface/wall mounted loudspeaker inclusive of matching transformer, enclosure, grille/baffle, mounting brackets, flexible heat resistant cable, etc. as specified	
E4609	1 no. horn loudspeaker inclusive of matching transformer, mounting bracket, flexible heat resistant cable, etc. as specified	
E4610	1 no. bedside loudspeaker inclusive of matching transformer, mounting bracket, enclosure, baffle, etc. as specified	
E4611	Wiring to 1 no. loudspeaker point (ie. any recessed/surface/wall mounted loudspeaker or horn loudspeaker) using the cables as specified inclusive of conduit/trunking and fittings, accessories, terminations, etc. (excluding loudspeaker)	
E4612	1 no. line receptacle unit as specified	

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Voice Communication System - Firemen Intercom System

Code No.	Description	Unit Rate (S$)
E4651	1 no. telephone set (slave unit) of the Firemen Intercom System with recessed or surface mounted enclosure as specified excluding all external connections	
E4652	Wiring to 1 no. slave unit point for the Firemen Intercom System using the cables as specified inclusive of conduit/trunking and fittings, accessories, terminations etc. (excluding slave unit)	

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MATV System

Code No.	Description	Unit Rate (S$)
E4801	1 no. TV/FM coaxial socket outlet as specified excluding all external connections	
E4802	1 no. 4 way tap-off unit as specified excluding all external connections	
E4803	1 no. 4 way splitter unit as specified excluding all external connections	
E4804	Wiring to 1 no. TV/FM coaxial socket outlet point using coaxial cables as specified inclusive of concealed or surface conduits and fittings, accessories, terminations, etc.	
E4805	1 no. TV antennae as specified excluding all external connections	

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CCTV System

Code No.	Description	Unit Rate (S$)
E4901	1 no. dome type CCTV camera without pan & tilt mechanism c/w accessories, etc. as specified excluding all external connections	
E4902	1 no. CCTV camera without pan & tilt mechanism c/w accessories, etc. as specified excluding all external connections	
E4903	1 no. CCTV camera with pan & tilt mechanism c/w accessories, etc. as specified excluding all external connections	
E4904	1 no. 14 inch video monitor as specified excluding all external connections	
E4905	1 no. 19 inch video monitor as specified excluding all external connections	
E4906	1 no. 21 inch video monitor as specified excluding all external connections	
E4907	1 no. 16-way automatic sequential switching unit as specified excluding external connections	
E4908	1 no. central controller as specified excluding external connections	
E4909	1 no. time-lapsed video recorder as specified excluding external connections	
E4910	1 no digital video recorder as specified excluding external connections	
E4911	1 no. printer as specified excluding all external connections	
E4912	1 no. remote camera controller as specified excluding all external connections	
E4913	Wiring to 1 no. CCTV camera (with or without pan & tilt mechanism) using the cables as specified inclusive of concealed or surface conduits /trunkings, fittings, accessories, terminations, etc per metre run	

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Card Access System

Code No.	Description	Unit Rate (S$)
E4921	1 no. door contact for single leaf swing door as specified excluding all external connections	
E4922	1 no. door contact for double leaf swing door as specified excluding all external connections	
E4923	1 no. movement detector as specified excluding all external connections	
E4924	1 no. panic button as specified excluding all external connections	
E4925	1 no. hold-up device as specified excluding all external connections	
E4926	1 no. guard tour station excluding all external connections	
E4927	1 no. card reader as specified excluding all external connections	
E4928	1 no. card as specified	
E4929	1 no. electric strike for door lock as specified excluding all external connections	
E4930	1 no. interface terminal as specified excluding all external connections for: (a) 8 monitored points	
	(b) 10 monitored points	
	(c) 12 monitored points	
	(d) 20 monitored points	
E4931	Wiring between central controller and interface terminals using the cable as specified inclusive of concealed/surface conduits/trunkings, fittings, accessories, terminations, etc. - per metre run	
E4932	Wiring between interface terminals and any monitored point (i.e. door contacts, movement detectors, etc.) using the cable as specified inclusive of conduits/trunkings, fittings, accessories, terminations, etc. - per metre run	
E4933	Wiring between interface terminals and any control point (i.e. lighting control etc.) using the cable as specified inclusive of conduits/trunkings, fittings, accessories, terminations, etc. - per meter run	

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Bedside Control Panel

Code No.	Description	Unit Rate (S$)
E5101	1 no. Bedside Control Panel c/w accessories, etc as specified excluding all external connection	
E5102	1 no. Living Room Control Panel c/w accessories, etc. as specified excluding all external connection	
E5103	1 no. Lobby Switch Panel c/w accessories, etc. as specified excluding all external connection	
E5104	1 no. Annunciation Panel c/w accessories, etc. as specified excluding all external connection	
E5105	1 no. Volume Control Panel c/w accessories, etc. as specified excluding all external connection	
E5106	1 no. Relay Control Panel c/w relays, contacts, ancillaries, etc. as specified excluding all external connection	
E5107	1 no. 1 Gang Switch Panel	
E5108	1 no. 2 Gang Switch Panel	
E5109	1 no. 3 Gang Switch Panel	
E5110	1 no. headphone jack	
E5111	1 no. TV controller	
E5112	1 no. key tag switch	
E5113	1 no. relay box	
E5114	Control wiring between the relay control panel and switch panel - per metre run	

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Building Services Intercom System

Code No.	Description	Unit Rate (S$)
E4701	1 no. desk top telephone set as specified excluding all external connections	
E4702	1 no. recessed telephone set with lockable enclosure as specified excluding all external connections	
E4703	1 no. wall mounted telephone set with surface mounted lockable enclosure as specified excluding external connections	
E4704	Wiring to any 1 no. telephone set point using the cables as specified inclusive of conduit/trunking and fittings, accessories, terminations etc. (excluding telephone set)	

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LV Cabling - MI Cables

Heavy duty **MI** cables (exposed to touch) on vertical/horizontal cable tray/cable ladder as specified inclusive of supporting brackets, cable tray/cable ladder, clips/saddles, fixings, terminations, joints and accessories, surge diverters etc. of the following sizes, **per metre run**:		
Code No.	Description	Unit Rate (S$)
E1501	4 x 240 mm^2/1C	
E1502	4 x 185 mm^2/1C	
E1503	4 x 150 mm^2/1C	
E1504	4 x 95 mm^2/1C	
E1505	4 x 70 mm^2/1C	
E1506	4 x 50 mm^2/1C	
E1507	4 x 35 mm^2/1C	
E1508	4 x 25 mm^2/1C	
E1509	4 x 16 mm^2/1C	
E1510	1 x 10 mm^2/4C	
E1511	1 x 6mm^2/4C	
E1512	1 x 4mm^2/4C	

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